

# EXHIBIT 5

## Pedro P. Irazoqui

Professor of Electrical and Computer Engineering  
Professor of Biomedical Engineering  
Whiting School of Engineering  
The Johns Hopkins University  
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### Education:

**Ph.D. University of California, Los Angeles**, Biomedical Engineering, June, 2003

Thesis: *"Transcutaneous Inductively-Powered Neural Recording System"*

Thesis Committee: J. W. Judy (advisor), I. Mody (advisor), F. Bezanilla, and W. J. Kaiser

**M.S. University of New Hampshire, Durham**, Electrical Engineering, May, 1999

Thesis - *"Evaluation of Integrated Antenna Diversity Systems"* (Advisor: J. T. Bernhard)

**B.S. University of New Hampshire, Durham**, Electrical Engineering, May, 1997

### Research leadership:

#### Professor

**Electrical and Computer Engineering and Biomedical Engineering Departments,  
Whiting School of Engineering, Johns Hopkins University** – July '21 – present

I am focused on the modular design and use of biological implants for the study and treatment of neural pathologies. Module types include those for: single and population neural recording; cortical and peripheral nerve excitation, inhibition, and blocking; muscle, including cardiac, digestive, and peripheral activity recording and control; and biochemical marker sensing. Engineering challenges in: open and closed-loop sensing and/or stimulation; wireless power, storage, and data transfer; and machine learning for autonomous personalized therapy arise from the physiological needs and are addressed as needed in my research. When combined into distinct embedded systems, these modules enable us, in partnership with scientists and clinicians working with our lab, to conduct high impact and hereto impracticable experiments. Specific research and clinical applications explored include: epilepsy, glaucoma, gastric motility, and photopharmacology.

#### Reilly Professor

**Weldon School of Biomedical Engineering, School of Electrical and Computer Engineering, Purdue University** – June '05 (beginning as assistant professor) – 2021  
Developed internationally recognized research program in implantable medical devices.

#### Director

**Center for Implantable Devices** – April '10 -2021

Founded Center for Implantable Devices (CID) to lead in the research, development, and translation of implantable medical devices through collaborations between Purdue faculty, and national and international clinical, and commercial partners. Grown in seven years to more than 20 faculty members, including five new tenure-track faculty hires, and over \$30M in extramural funding.

**Administrative leadership:****Head**

**Electrical and Computer Engineering Department, Whiting School of Engineering, Johns Hopkins University**– Jul ‘21 – Nov ‘22

Leading the growth of Electrical and Computer Engineering (ECE). Priorities were: 1) successfully hiring 5 new faculty; 2) managing transition from chair to new head model; 3) identifying breadth and depth of opportunities within the department.

**Interim Head**

**School of Electrical and Computer Engineering, Purdue University**– Aug ‘18–May ‘19

Leading the transition and extramural search for a permanent head for the School of Electrical and Computer Engineering. Broad impact in five key areas in the interim: promotion and tenure of faculty within largest school in the college of engineering; recruiting five world class faculty to establish and grow Computer Systems Engineering (CSE) area within the department; reimagining graduate student recruitment efforts across the school with particular emphasis on CSE; development and relationship building with alumni and industry; renovation and reallocation of existing and new space within the school.

**Chief Clinical Translation Officer**

**College of Engineering, Purdue University** – November ‘17 – August ‘18

Member of College of Engineering Leadership Team (ELT). Enabling physician-engineer collaborations in preclinical, clinical, and entrepreneurial efforts to translate engineering advances to clinical impact. Growing Purdue bioengineering partnerships with GCBS, IUSM, across the college of engineering. Streamlining translation to clinical trials.

**Associate Head for Research**

**Weldon School of Biomedical Engineering, Purdue University** – June ‘13 – June ‘18

Leading the growth of the research enterprise at the Weldon School of Biomedical Engineering. One of four leadership team members of \$25M neuroscience pillar. Lead on conception, design, construction, equipping and administration of preclinical and behavioral bioengineering building wing (\$14M). Built institutional partnership between Purdue bioengineering and The Jackson Laboratory – leading to two completed seed grant cycles funding PIs at both institutions. Built Purdue NIDA partnership leading to funding of bioengineers working to address the opioid crisis in partnership with clinicians. Built Purdue bioengineering and Goodman-Campbell Brain and Spine (GCBS) partnership with translational support and annual retreats at both campuses. Built Purdue bioengineering and Indiana University School of Medicine (IUSM) Glick Eye Institute partnership (modeled on GCBS above). Built Purdue bioengineering and IUSM Surgical partnership – leading to one completed round of seed grants with funding secured from the Indiana Clinical and Translational Sciences Institute (CTSI). Built Purdue bioengineering Lawrence Livermore National Labs partnership with multiple exchange trips bringing together PIs at both institutions in collaborative opportunities. Direct supervisor for >12 research staff in the Weldon School. Chair of research committee. Primary responsibility for all research and student space and facilities. Led winning team in competition for faculty lines at the college level - subsequently hiring chair for five new tenure track faculty in last five years. Identifying and building consensus around four research areas of excellence for the Weldon School of Biomedical Engineering – built out critical mass of faculty, space, equipment in each area.

**Other Professional and Research Activities:****Chair****IEEE Neuroengineering Conference** – Spring ‘23

Lead the organization of this conference in a uniquely representative team of researchers.

**External Advisory Board Member****Bioengineering, University of Puerto Rico at Mayaguez** – December ‘17 to present

Mentorship and advice on the growing bioengineering graduate program at the University of Puerto Rico at Mayaguez.

**External Advisory Board Member****Bioengineering, University of Edinburgh** – June ‘18

Mentorship and advice on the growing bioengineering graduate program at the University of Edinburgh.

**Scientific Adviser****Neurava, LLC, West Lafayette, IN** – June ‘19 to present

Advising current Ph.D. students as they commercialize our electroceutical therapy for epilepsy and SUDEP.

**Co-founder and CTO****Bionode, LLC, Chicago, IL** – January ‘16 to present

Commercializing electroceutical therapy for glaucoma. 10-40% reduction in IOP in 15 minutes, with no side effects, from wearable device.

**Associate Editor****IEEE Transactions on Biomedical Engineering** – December ‘06 to present

Management of the peer review of manuscripts by members of the technical community for publication in the flagship IEEE journal for the field of Biomedical Engineering.

**Associate Editor****Journal of Neural Engineering** – November ‘16 to present

Management of the peer review of manuscripts by members of the technical community for publication in the Journal of Neural Engineering.

**Co-founder and VP of IC Design****Triangle Biosystems Inc., Durham, NC** – July ‘03 to May ‘05

Commercializing my PhD work as head of development of analog ASICs for wireless headstages, including RF oscillators, amplifiers, filters and neural pre-conditioning circuits. Embedded real-time acquisition and processing system designer. Acquired by Harvard Biosciences in fall of 2014.

**Chancellors Fellow****University of California, Los Angeles** – August ‘99 to May ‘03

PhD dissertation work into the design, manufacture, and packaging of a first-of-its-kind miniature implantable wireless neural recording device allowing for unprecedented in vivo study of the role the natural environment plays in the development of epilepsy, and in other high-level neuroscience phenomena.

**Teaching Activities:****- Professor EN.520.420 Bioelectricity from neurons to semiconductors**

(Evaluation: Spring '23 – )

Created new course, in which students use the engineering concepts learned in Mastering Electronics (or equivalent) and mathematical tools to understand and analyze basic bioelectricity and circuit theory in the context of the mammalian nervous system. A second objective is to instill an appreciation for the similarities between electricity in biology and in silicon circuits, enabling you to begin interfacing the two in simple recording and stimulating experiments.

**- Professor EN520.230: Mastering Electronics**

(Evaluation: Fall '21 – 4.3/5)

Completely refreshed course in which students will have a solid understanding of basic and fundamental electrical engineering concepts and rules and will be able to build and design a wide range of devices. Class lectures cover the fundamental concepts of circuits, followed by laboratory exercises that demonstrate the basic concepts. Topics include phase and frequency response, transistors, operational amplifiers, filters, and other analog circuits. The experiments are done using computer controlled digital oscilloscopes, function generators, and power supplies.

**- Professor ECE29595: Electrical Engineering Fundamentals I**

(Evaluation: Spring '19 – 4.8/5; Spring '20 – 4.4/5)

Taught core course on fundamentals of electrical and computer engineering. Charge, voltage, current, power, R, L, C, 1<sup>st</sup> order circuits, dc, ac, steady-state, phasors, along with a brief introduction to semiconductor physics, diodes, and MOSFETs.

**- Professor BME301: Bioelectricity**

(Evaluation: Fall '05 – 4.8/5; Fall '06 – 4.6/5; Fall '07 – 4.7/5; Fall '08 – 4.7/5; Fall '09 – 4.6/5; Fall '10 – 4.7/5; Fall '11 – 4.5/5; Spring '14; Fall '14 – 4.0/5; Fall '15 – 4.7/5; Fall '16 – 4.9/5; Fall '17 – 4.8/5; Fall '18 – 4.1/5; Fall '20 – )

Designed and taught course on fundamentals of bioelectricity of the mammalian nervous system and other excitable tissues. Passive and active forms of electric signals in both the single cell and cell-cell communication, tissue and systematic bioelectricity, mathematical analysis including Nernst equation, Goldman equation, linear cable theory, and Hodgkin-Huxley Model of action potential generation and propagation. Extensive modeling using Matlab and SPICE of cells and circuits.

Taught in the spring of 2014 as online nanoHub-U course with 92 students from around the world in attendance.

Taught in the fall of 2015 as online edX course with over 6,000 students from around the world in attendance.

**- Professor BME405: Senior Design**

(Evaluation: Fall '07 – 4.1/5, Fall '08 – 3.4/5; Fall '09 – 4.2/5; Fall '10 4.3/5; Fall '13 3.8/5; Fall '14 4.7/5)

Designed and taught capstone design course in biomedical engineering. In it, seniors put into practice the engineering design, planning, and problem solving techniques learned over the course of their time in the program. Six-to-nine teams of four students each tackle individual neuroengineering device designs culminating in *in-vivo* testing of their prototypes. This course rewards originality and innovation in engineering design and

execution above all things, and aims to provide graduating seniors with the leadership and presentation skills they will need to succeed in industry.

- Professor **BME595M: Analog Integrated Circuit Design for Biomedical Applications** (Evaluation: Fall '06 – 4.8/5; Fall '11 – 4.3/5)  
Designed and taught graduate-level design course, teaching the art of analog circuit design for biomedical applications. The course has a strong mixture of theory and application with a semester project where students design, simulate, layout, verify, and fabricate an ASIC for a biomedical application. This course gives students an understanding regarding the issues, limitations, and more importantly the possibilities that exist for analog instrumentation in the medical marketplace.
- Professor and Mentor of **BME595E: Biomedship** (Winter '06)  
Advised small team on translational entrepreneurial project.
- Professor and co-developer **BME595B lab: Biomedical Signal Processing**  
Advised TA in the design and teaching of hardware lab component for an introduction to the application of digital signal processing to practical problems involving biomedical signals and systems. Primary instructor was Dr. Michael Heinz. Topics included: examples of biomedical signals; analysis of concurrent, coupled, and correlated processes; filtering for removal of artifacts; event detection; analysis of waveshape and waveform complexity; frequency domain characterization of signals and systems; modeling biomedical signal-generating processes and systems; analysis of nonstationary signals; pattern classification and diagnostic decision.

#### Grants received:

1. *Current* – PI: A. Yorita, Co-PIs: A. Ivanovskaya, **P. P. Irazoqui**, B. Petersen, A. Rasley, B. Baker, E. Mukerjee, “Host-directed, Bioelectronic Immunomodulation for Protection Against Emerging Pathogens,” Lawrence-Livermore National Labs (LLNL) Laboratory-Directed Research and Development (LDRD) Award, \$2,235,000 total, \$525,000 to my lab (direct costs), 10/1/2022-9/30/2025
2. *Current* – Co-PIs: T. Johnson, **P. P. Irazoqui**, “Application of Exogenous Electric Fields to Facilitate Retinal Ganglion Cell Engraftment within the Visual Pathway,” JHU Discovery Award, \$100,000, 9/1/2022-8/31/2023
3. *Current* – PI: A. Llebaria, Co-PIs: **P. P. Irazoqui**, J. Inserte, “High precision cardioprotective therapy: a photoswitchable approach to reduce the extension of myocardial infarction,” La Caixa Foundation, €999,779.50, 9/1/2021-8/31/2024
4. *Current* – PI: **P. P. Irazoqui**, Co-I: John Jefferys, “Sequence of physiological events during oxygen conserving reflex activation leading to sudden death in epilepsy,” NIH NINDS 1R01NS19390-01, \$1,250,000 (direct costs), 12/1/2020-11/30/2025.
5. *Completed* – PI: **P. P. Irazoqui**, Co-Is: A. Alam, E. Delp, T. Kinzer-Ursem, C. H. Lee, H. Lee, J. Linnes, K. Park, S. Sen, L. Solorio, Y. Yeo, M. Zhu, “Eli Lilly: Connected Solutions,” Eli Lilly, \$3,966,636 (direct costs per year of four year program), 6/1/2018-6/30/2022.
6. *Completed* – PI: Terry Powley Co-PIs: **P. P. Irazoqui**, John Furness, Paul Robinson, Zhongming Liu, Bartek Rajwa, Matthew Ward, “Mapping Stomach Autonomic Circuitry and Function for Neuromodulation of Gastric Disorders,” National Institutes of Health (NIH SPARC), \$8,759,484 (direct costs), 9/1/2019-7/31/2022.
7. *Completed* – PI: Terry Powley Co-PIs: **P. P. Irazoqui**, John Furness, Paul Robinson, Zhongming Liu, Jenna Rickus, Bartek Rajwa, Matthew Ward, “Mapping Stomach

- Autonomic Circuitry and Function for Neuromodulation of Gastric Disorders,” National Institutes of Health (NIH SPARC), \$5,492,064 (direct costs), Awarded August 2016.
8. *Completed* - PI **P. P. Irazoqui**, “Bionode Development,” Bionode Inc., \$230,000 (direct costs), Awarded July 2017.
  9. *Completed* – PIs: P. Pasquina, Todd Kuiken, Levi Hargrove, **P. P. Irazoqui** “A Pilot Trial to Assess Implantable MyoNodes to Improve Prosthetic Function for Transhumeral Amputees after Targeted Muscle Reinnervation,” Army, \$1,200,000 (direct costs), Awarded June 2016.
  10. *Completed* – Co-PIs: **P. P. Irazoqui**, Thelma Lovick, “GSK Innovation Challenge: Closed-loop neuromodulation of urinary incontinence,” Glaxo Smith Kline (GSK), \$1,000,000 (total costs), Awarded October 2015.
  11. *Completed* – Co-PIs: **P. P. Irazoqui**, Terry Powley, Paul Robinson, Zhongming Liu, Matthew Ward, “Suppressing Inflammation via Neuromodulation of the GI Tract,” Defense Advanced Research Projects Agency (DARPA), \$3,169,661 (total costs), Awarded May 2015.
  12. *Completed* – Co-PIs: **P. P. Irazoqui**, Tom Nowak, Matthew Ward, “Effect of gastric electrical stimulation on vagal nerve conduction in patients with gastroparesis,” Indiana Clinical and Translational Sciences Institute (CTSI), \$75,000 (direct costs), Awarded Oct 2014.
  13. *Completed* –PI: Leonid Rubchinsky, Co-Investigators: **P. P. Irazoqui**, Robert Worth, “Closed-loop adaptive deep brain stimulation for Parkinson’s disease,” Indiana Clinical and Translational Sciences Institute (CTSI), \$99,814 (direct costs), Awarded Jul 2014.
  14. *Completed* - PI John Jefferys, Co-Investigators: **P. P. Irazoqui**, Thelma Lovick, “Autonomic dysfunction in experimental epilepsy: potential mechanisms for SUDEP,” Epilepsy Research United Kingdom (ERUK), £234,693 (direct costs), Awarded May 2014.
  15. *Completed* - PI K. Seburn, Co-Is **P. P. Irazoqui**, R. Burgess, G. Cox, “Long-term In Vivo Monitoring of Neuromuscular Performance in Mice,” National Institutes of Health, Irazoqui budget: \$157,384 (direct costs), Awarded September 2013.
  16. *Completed* - PI Z. Rodd, Co-I **P. P. Irazoqui**, “Preclinical Assessment of Deep Brain Stimulation for the Treatment of Alcoholism,” National Institutes of Health, Irazoqui budget: \$99,270 (direct costs), Awarded September 2013.
  17. *Completed* - Co-PIs **P. P. Irazoqui**, S. W. M. John, “Novel Implantable Devices for Glaucoma Research,” Pew Charitable Trust, \$500,000 (direct costs renewable for each of two years - \$1M total), Awarded May 2013.
  18. *Current* - PI M. Lundstrum, Co –investigators: M. Alam, Z. Chen, J. Clark, S. Datta, **P. P. Irazoqui**, A. Raghunathan, K. Roy, A. Shakouri, J. Roychowdhury, E. Alon, C. Chang-Hasnain, D. Antoniadis, L. Daniel, D. Weinstein, M. Watts, “Network for Computational Nanotechnology - NEEDS Node,” National Science Foundation, \$3,500,000 (direct costs), Awarded September 2012.
  19. *Completed* - PI M. Harris, Co –investigators: B. Boudouris, P. K. Imbrie, **P. P. Irazoqui**, Y. Wu, “NUE: Improvement of Nanoscale Device Education via Theory, Experimental Design, and Characterization,” National Science Foundation, \$200,000 (direct costs), Awarded August 2012.
  20. *Completed* - PI **P. P. Irazoqui**, “Epilepsy Technology Development Proposal,” Cyberonics Inc., \$1,017,755 (total costs), Awarded August 2012.
  21. *Completed* - PI **P. P. Irazoqui**, Co-I Levi Hargrove “Improving Robustness of Prosthetic Arm Control with an Innovative RF-Based Implantable EMG Sensor,” Defense



- Advanced Research Projects Agency, \$1,902,263 (direct costs), Awarded November 2011.
22. *Completed* - PI A. Rundell, Co-Investigators: S. Harbin, **P. P. Irazoqui**, K. Park, A. Panitch, A. Sieving, "A Multidisciplinary and Needs-Driven Approach to Translational Team-based Biomedical Engineering Design," National Institutes of Health - NIBIB, \$43,200 (direct costs), Awarded April 2011.
  23. *Completed* - PI **P. P. Irazoqui**, K. Roy, J. L. Rickus, "Core Technology Development Plan for Cyberonics Next-Generation Devices," Cyberonics Inc., \$1,200,000 (total costs), Awarded February 2010.
  24. *Completed* - Co-PIs: W. Chappell, **P. P. Irazoqui**, S. John, "An Implantable Ultra-Miniature Pressure Sensor with Remote Interrogation System," Howard Hughes Medical Institute Collaborative Innovation Award, \$4,149,167 (direct costs), Awarded July 2008.
  25. *Completed* - PI **P. P. Irazoqui**, "Intra-Cardiac Human Pressure Sensor," Viricor, Inc, \$300,000 (total costs), Awarded August 2011.
  26. *Completed* - PI **P. P. Irazoqui**, "Magnetic Insertion System for Ultra-Thin Neural Electrodes," Defense Advanced Research Projects Agency, \$165,950 (direct costs), Awarded November 2010.
  27. *Completed* - PI **P. P. Irazoqui**, R. M. Worth, "A Continuous Seizure Monitoring Implant for Epilepsy Surgery Candidates," Wallace H. Coulter Foundation Early Career Award Phase II, \$220,000 (direct costs), Awarded August 2009.
  28. *Completed* - PI **P. P. Irazoqui**, "Multi-Pronged Epilepsy R&D Effort," Cyberonics Inc., \$680,732 (total costs), Awarded November 2008.
  29. *Completed* - PI **P. P. Irazoqui**, R. M. Worth, "A Hermetic Biocompatible Ceramic Package for Neural Prostheses," Wallace H. Coulter Foundation Early Career Award, \$200,000 (direct costs), Awarded June 2007.
  30. *Completed* - PI **P. P. Irazoqui**, "Repair of Traumatic Brain Injury Through Wireless Electrical Stimulation," Purdue Research Foundation (PRF), \$7,000 (direct costs), Awarded February 2007.
  31. *Completed* - PI **P. P. Irazoqui**, "An Auditory Central Nervous System Prosthesis," Purdue Research Foundation (PRF), \$14,000 (direct costs), Awarded September 2007.
  32. *Completed* - PI **P. P. Irazoqui**, B. Ziaie, "A Wireless Active IOP Sensor Integrated With SOLX Gold Micro-Shunt," SOLX, \$440,332 (total costs), Awarded January 2007.
  33. *Completed* - PI **P. P. Irazoqui**, R. B. Borgens "Wireless Electrical Stimulation of Neural Injury Repair," Trask Foundation, \$47,331 (direct costs), Awarded June 2006.
  34. *Completed* - PI **P. P. Irazoqui**, "Building Blocks for a Clinical Brain-Machine Interface," The MOSIS Service, \$50,000 (direct costs), Awarded February 2006.
  35. *Completed* - PI **P. P. Irazoqui**, "Brain-Computer Interfaces for Epilepsy Prosthetics," Purdue Research Foundation (PRF), \$30,000 (direct costs), Awarded February 2006.
  36. *Completed* - PIs **P. P. Irazoqui**, J. L. Rickus, "A Hybrid Cellular-Silicon Neural Prosthetic for Epilepsy," Citizens United for Research in Epilepsy (CURE) Christopher Donalty Award, \$100,000 (direct costs), Awarded January 2006.
  37. *Completed* - PI **P. P. Irazoqui**, "A Novel Wireless Combined Neural Recording and Stimulating Headstage," NSF SBIR Phase I Proposal 0419453 , \$99,250 (total costs), Awarded June 2004.



**Advising:****Post Doctoral Students:****Former:**

Eric Chow – May 2009 – April 2010 – see below, under former Ph.D.  
 Katherine Musick – January 2009 – June 2010 – Sr. Engineer, Sandia National Lab  
 Shriram Raghunathan – January 2011 – May 2011 – see below, under former Ph.D.  
 Art Chlebowsky – May 2012 – Dec 2012 – see below, under former Ph.D.  
 Chuizhou Meng – August 2011 – 2014 – **Professor**, Hebei University of Technology  
 Matthew Ward – May 2012 – 2015– see below, under former Ph.D.  
 Jimin Maeng – May 2014 – 2016 – see below, under former Ph.D.

**Graduate Students:****Current Ph.D. and M.S.**

Hans Ajieren – Ph.D. ECE expected in May '24  
 Ryan Budde – Ph.D. BME expected in May '24  
 Brett Collar – Ph.D. ECE expected in May '24  
 Kwesi Debrah – Ph.D. ECE expected in May '27  
 Sadid Khan – Ph.D. ECE expected in May '26  
 Georgia Lawlor – Ph.D. ECE expected in May '24  
 Sucheta Malladi – Ph.D. ECE expected in May '27  
 Trevor Meyer – Ph.D. ECE expected in May '24  
 Laura Roa – Ph.D. ECE expected in May '25  
 Michael Williams – Ph.D. ECE expected in May '24

**Former Ph.D.**

Eric Chow – Ph.D. ECE May '09 – Senior Director of Product Development, Abbott Labs  
 Shriram Ragunathan – Ph.D. BME December '10 – Founder & CEO, Noctrix Health  
 Travis Hassell – M.D./Ph.D. BME December '10 – Assistant **Professor**, Vanderbilt  
 Pooja Rajdev – Ph.D. BME May '11 – Consultant, Manipal Hospitals  
 Brooke Beier – Ph.D. BME December '11 – Executive Director, O. Tech. Com., Purdue  
 Arthur Chlebowsky – Ph.D. BME May '12 – Associate **Professor**, U. Southern Indiana  
 Matthew Ward – Ph.D. BME May '12 – Assistant **Professor**, Purdue University  
 Jimin Maeng – Ph.D. ECE May '14 – Research Associate, UT Dallas  
 Oren Gall – Ph.D. ECE May '14 – Assistant Research **Professor**, Penn State  
 Steven Lee – M.D./Ph.D. BME May '15 – Neurology Resident, Baylor CoM  
 Kurt Qing – M.D./Ph.D. BME May '15 – Neurology Fellow, Stanford  
 Rebecca Bercich – Ph.D. BME May '16 – Associate **Professor**, Rose-Hulman  
 Henry Mei – Ph.D. BME May '16 – Sr. Engineer, Medtronic  
 Hansraj Singh Bhamra – Ph.D. ECE August '16 – R&D Hardware Engineer, Broadcom  
 Young Kim – Ph.D. ECE August '16 – Assistant **Professor**, Gachon University, Korea  
 Yu-Wen Huang – Ph.D. ECE December '17 – Engineer, Cascade Microtech  
 Jesse Somman – Ph.D. ECE June '18 – Lt. Colonel, USAF  
 Jack Williams – Ph.D. ECE October '18 – Research Scientist, CU Boulder  
 Dan Pederson – Ph.D. ECE November '18 – CTO, Cadence Neuroscience  
 Mohammad Arafat – Ph.D. ECE October '19 - Assistant **Professor** ECE, BUET, Bangladesh  
 Jui Wei Tsai – Ph.D. ECE August '20 – Engineer, Taipei, Taiwan  
 Ranajay Mandal – Ph.D. BME December '20 – Sensing Hardware Engineering, Apple  
 Chris Quinkert – Ph.D. ECE December '20 – Sr. Design Engineer, Intrinsic Corp.  
 Jay Shah – Ph.D. ECE August '21 – CEO, Neurava Inc.  
 Ethan Biggs – Ph.D. BME August '22 – Completing MD portion of MD/PhD

Vivek Ganesh – Ph.D. ECE November '22 – CSO, Neurava Inc.

### Former M.S.

Mitchell Cohen – M.S. ECE awarded May '07  
 Matthew Graves – M.S. BME awarded in December '09  
 Gabriel Albors – M.S. BME awarded in December '09  
 Adam Kahn – M.S. BME awarded in May '10  
 Sonal Ravji Sadaria – M.S. BME awarded May '11  
 Brad Lohmeyer – M.S. ME awarded May '12  
 Sajia Sadeque – M.S. ECE awarded May '12  
 Emily Cook – M.S. BME awarded May '12  
 Arjun Jaitli – M.S. BME awarded May '12  
 Ian Dryg – M.S. BME awarded August '13  
 Jithin Joseph – M.S. ECE awarded August '13  
 Grant Wang – M.S. ECE awarded December '15  
 Kyle Thackston – M.S. BME awarded May '16  
 Kaitlyn Jarry – M.S. BME awarded June '16  
 Kelsey Bayer – M.S. BME awarded December '17  
 Kelsey Wasilczuk – M.S. BME awarded in May '18  
 Gang Seo – M.S. BME awarded in May '18  
 Rachel Swenson – M.S. BME awarded in May '19  
 Curtis Slaughbaugh – M.S. BME awarded in December '19

### Undergraduate Student Researchers (past and present):

- Teeba Alkhudairi – B.S. BME May '07	- Art Chlebowsky – B.S. BME May '07
- Matt Graves – B.S. BME May '07	- Pamela Jimenez – B.S. ECE May '07
- Adam Kahn – B.S. BME May '07	- Sean Kelly – B.S. BME May '07
- Matt Makowski – B.S. ECE May '07	- Matt Ward – B.S. BME May '07
- Brooke Beier – B.S. BME May '08	- Maria Dadarlat – B.S. BME May '08
- Steven Lee – B.S. BME May '08	- Omeed Paydar – B.S. BME May '08
- Omar Abdel-Latif – B.S. BME May '09	- Brandon Bruhn – B.S. BME May '09
- Nate Elder – B.S. BME May '09	- Patrick Sadtler – B.S. BME May '09
- Rebecca Bercich – B.S. BME May '10	- Andrew Janson – B.S. BME May '10
- Daniel Kennedy – B.S. BME May '10	- Adam Petersohn – B.S. BME May '10
- Sonal Ravji Sadaria – B.S. BME May '10	- Brad Trembacki – B.S. BME May '10
- Yun Jin Koh – B.S. BME Dec '10	- Henry Mei – B.S. BME Dec '10
- Kyle Kelly – B.S. BME Dec '10	- Neo Palettas – B.S. BME Dec '10
- Henry Zhang – B.S. BME Dec '10	- Emily Cook – B.S. BME May '11
- Arjun Jaitli – B.S. BME May '11	- Chris Babcock – B.S. BME May '11
- John Usher – B.S. BME May '11	- David Wilkes – B.S. ECE May '11
- Ian Dryg – B.S. BME May '12	- K. Costalunga – B.S. BME May '13
- Daniel Duffy – B.S. BME May '13	- Jarrod Hunnicutt – B.S. BME May '13
- Jonathan Manring – B.S. BME May '13	- Kyle Ng – B.S. BME May '13
- Dakota Schmitt – B.S. BME May '13	- Alec Green – B.S. ECE May '14
- Alex Kokini – B.S. BME May '14	- K. Hernandez – B.S. ECE May '14
- Malika Datta – B.S. BME May '15	- Kyle Thackston – B.S. BME May '15
- Chris Quinkert – B.S. BME May '15	- Leila Cavalcanti – B.S. BME May '15
- Libby St. Clair – B.S. BME May '16	- Kaitlin Jarry – B.S. ECE May '16
- Jesse Bucksott – B.S. BME May '16	- Jynx Boyne – B.S. BME May '16
- Kelsey Bayer – B.S. BME May '16	- Vivek Ganesh – B.S. BME May '17

- Yumin Gao – B.S. BME May '17
- Kelsey Wasilczuk – B.S. BME May '17
- Ryan Budde – B.S. BME May '18
- Rachel Swenson – B.S. BME May '18
- Brett Collar – B.S. BME May '19
- Trevor Meyer – B.S. BME May '19
- Carson Rivard – B.S. BME May '19
- Sui Shen – B.S. BME May '19
- Michael Williams – B.S. BME May '19
- Sydney Sofronici – B.S. BME May '20
- Nick Chelales – B.S. BME May '20
- Victoria Ochs – B.S. BME May '20
- Sadid Khan – B.S. BME Dec '20
- Yug Rao – B.S. ECE May '21
- Ted Silliman – B.S. BME May '22
- Kondi Phiri – B.S. ECE May '24
- Eleni Daskopoulou – B.S. ECE May '24
- Gang Seo – B.S. BME May '17
- Ethan Biggs – B.S. BME May '18
- Songingwei Li – B.S. BME May '18
- Cory Chilcote – B.S. BME May '19
- Georgia Lawlor – B.S. BME May '19
- A. Mortazavi – B.S. BME May '19
- Logan Rubin – B.S. BME May '19
- Edward Tournay – B.S. BME May '19
- Trevor Meyer – B.S. BME May '20
- Yvonne Chen – B.S. BME May '20
- Andrew Fox – B.S. BME May '20
- Tony Vukovich – B.S. BME May '20
- Isaac Meng – B.S. ECE May '21
- Kelsey Maccadino – B.S. BME May '22
- Camden Schultz – B.S. ECE May '24
- Ryan Ahn – B.S. ECE May '24
- Chris Kanzki – B.S. ECE May '24

#### Graduate Student Committees Chaired:

1. V. Ganesh – Ph.D. ECE, “Development of a Closed-Loop. Implantable Electroceutical Device for Gastric Disorders,” successfully defended 11-18-22
2. E. Biggs – Ph.D. BME, “On the Role of, and Intervention in, Oxygen-Conserving Reflexes in Sudden Unexpected Death in Epilepsy,” successfully defended 7-18-22
3. J. Shah – Ph.D. ECE, “Development of a Closed-Loop, Implantable, Electroceutical Device for Glaucoma,” successfully defended 7-22-21
4. C. Quinkert – Ph.D. ECE, “Practical and Reliable Wireless Power Supply Design for Low Power Implantable Medical Devices,” successfully defended 12-4-20
5. R. Mandal – Ph.D. BME, “MRI Integrated Systems for Multimodal Imaging,” successfully defended 11-20-20
6. J. W. Tsai – Ph.D. ECE, “*Digital Signal Processing Architecture Design for Closed-Loop Electrical Nerve Stimulation Systems*,” successfully defended 8-13-20
7. M. Arafat – Ph.D. ECE, “*Method of Thin Flexible Microelectrode Insertion in Deep Brain Region for Chronic Neural Recording*,” successfully defended 10-29-19
8. R. Swenson – M.S. BME, “*Design of a Closed-Loop System for Glaucoma Treatment Including Measurement of Intraocular Pressure and Therapeutic Stimulation of the Eye*,” successfully defended 4-9-19
9. D. Pederson – Ph.D. ECE, “*Determining, Treating, and Preventing Mechanisms of Sudden Death in Epilepsy Using Medical Implantable Devices*,” successfully defended 11-12-18
10. J. Williams – Ph.D. ECE, “*Magnetically-Coupled Circuits Systems for Wireless Excitation of Passive Stimulators for Stimulation Therapies and Application as a Treatment for Glaucoma*,” successfully defended 10-25-18
11. J. Somman – Ph.D. ECE, “*A Study of Techniques and Mechanisms of Vagus Nerve Stimulation for Treatment of Inflammation*,” successfully defended 6-11-18
12. K. Wasilczuk – M.S. BME, “*Low Intensity Focused Ultrasound Stimulation of the Vagus Nerve for Modulating the Inflammatory Reflex Assessed in Rat Model*,” successfully defended 4-18-18
13. G. Seo – M.S. BME, “*Bionode5.0: a Miniature, Wireless, Closed-Loop Biological Implant for Neuromodulation*,” successfully defended 4-16-18

14. Y. W. Huang – Ph.D. ECE, “*CMOS Low-Power Dynamic Impedance Matching System for Wireless Power Transfer and Pressure Sensor Design for Implantable Devices*,” successfully defended 11-29-17
15. K. Bayer – M.S. BME, “*Design of a Small, Affordable Low Intensity Focused Ultrasound Device for Vagus Nerve Stimulation*,” successfully defended 11-27-17
16. K. Jarry – M.S. BME, “*An Exploratory Study of How Acute Neuromodulation of the Subdiaphragmatic Branches Regulates Inflammation*,” successfully defended 6-26-17
17. Y. Kim – Ph.D. ECE, “*Low Power Cmos IC, Biosensor and Wireless Power Transfer Techniques for Wireless Sensor Network Application*,” successfully defended 7-18-16
18. H. Bhamra – Ph.D. ECE, “*Micro-Power Circuits and Systems for Wireless Sensor Nodes and Implantable Medical Devices*,” successfully defended 7-18-16
19. R. Bercich – Ph.D. BME, “*Improving the Mechanistic Study of Neuromuscular Diseases through the Development of a Fully Wireless and Implantable Recording Device*,” successfully defended 4-18-16
20. K. Thackston – M.S. BME, “*Optimization of Wireless Power Networks for Biomedical Applications*,” successfully defended 4-7-16
21. H. Mei – Ph.D. BME, “*Coupled Resonator Based Wireless Power Transfer for Bioelectronics*,” successfully defended 3-28-16
22. K. Qing – Ph.D. BME, “*Optimizing the neural response to electrical stimulation and exploring new applications of neurostimulation*,” successfully defended 4-24-15
23. S. T. Lee – Ph.D. BME, “*Wireless tools for neuromodulation*,” successfully defended 4-21-15
24. O. Gall – Ph.D. ECE, “*Power Management of Miniature Implantable Device Systems*,” successfully defended 4-23-14
25. J. Maeng – Ph.D. ECE, “*Parylene-Based Three-Dimensional Microsystems Packaging for Autonomous Wireless Implantable Medical Devices*,” successfully defended 4-4-14
26. I. Dryg – M.S. BME, “*Magnetically Inserted Neural Electrodes: Immune Response and Functional Lifetime*,” successfully defended 7-19-13
27. M. P. Ward – Ph.D. BME, “*Cranial nerve modulation for treatment-resistant major depressive disorder and temporal lobe epilepsy*,” successfully defended 5-29-12
28. A. L. Chlebowski – Ph.D. BME, “*An Implantable Intraocular Pressure Monitoring Device*,” successfully defended 5-29-12
29. E. M. Cook – M.S. BME, “*Miniaturization of a Radio Frequency Powered Implantable Electrode for Targeted Muscle Reinnervation*,” successfully defended 5-23-12
30. A. Jaitli – M.S. BME, “*Validation of Real time seizure detection algorithm and Control towards Closed loop epilepsy prostheses*,” successfully defended 5-21-12
31. B. L. Beier – Ph.D. BME, “*The Design and Development of a Continuous Intravascular Monitoring Stent*,” successfully defended 11-9-11
32. B. Bercich – M.S. BME, “*Robotic Arm for Testing and Demonstration of Targeted Muscle Reinnervation with Implications for Low-Cost Upper-Limb Prostheses*,” successfully defended 4-18-11
33. S. Sadaria – M.S. BME, “*Wireless Single Channel Sensor for Targeted Muscle reinnervation*,” successfully defended 4-18-11
34. P. Rajdev – Ph.D. BME, “*Seizure Prediction and Optimized Control Algorithms for Epilepsy Prostheses*,” successfully defended 2-25-11
35. T. Hassell – Ph.D. BME, “*A Wireless Implantable System For The Real-Time Surveillance And Modulation of Central Nervous System Recovery Following Spinal Cord Injury*,” successfully defended 12-2-10

36. S. Raghunathan – Ph.D. BME, “*Low-power seizure detection hardware on integrated neural recording platforms for closed-loop epilepsy prostheses*,” successfully defended 11-23-10
37. B. L. Beier – M.S. BME, “*Toward a Continuous Intravascular Glucose Monitoring System*,” successfully defended 4-9-10
38. A. R. Kahn – M.S. BME, “*A High Data-Rate Wireless Receiver for Implantable Biomedical Devices*,” successfully defended 4-7-10
39. G. O. Albors – M.S. BME, “*A Programmable Wireless Oscillating Field Stimulator*,” successfully defended 12-2-09
40. A. L. Chlebowski – M.S. BME, “*Advanced Radio Frequency Materials for Packaging of Implantable Biomedical Devices*,” successfully defended 7-22-09
41. M. S. Graves – M.S. BME, “*High Duty-Cycle AC Stimulation for Electrically-Mediated Spinal Cord Therapy*,” successfully defended 7-20-09
42. Eric Chow – Ph.D. ECE, “*Wireless Miniature Implantable Devices and ASICs for Monitoring Treatment and Study of Glaucoma and Cardiac Disease*,” successfully defended 4-20-09
43. Eric Chow – M.S. ECE, “*High Data-Rate Wireless Transcutaneous-Telemetry Using High-Frequency ASICs for Neural Prostheses*,” successfully defended 4-17-07

#### Awards, Fellowships, and Honors

- **Finalist IET AF Harvey Prize, 2023**
- Purdue Excellence in Research Award, 2020
- **College of Engineering Faculty Excellence Award for Research, 2019**
- Purdue Excellence in Research Award, 2018
- **Named Chair:** Reilly Professor of Biomedical Engineering, 2017
- **College of Engineering Team Award, 2017**
- Purdue Excellence in Research Award, 2017
- Purdue Excellence in Research Award, 2016
- **Fellow, American Institute for Medical and Biological Engineering, 2016**
- Purdue Excellence in Research Award, 2015
- Purdue Innovator Hall of Fame, 2013
- Showalter Faculty Scholar Award, 2013
- **Purdue University Faculty Scholar Award, 2013**
- Purdue Excellence in Research Award, 2013
- Purdue Excellence in Research Award, 2012
- “A Seed for Purdue” (now called the Excellence in Research) Award, 2010
- **Best Teacher Award, Weldon School of Biomedical Engineering 2008-2009**
- Outstanding Biomedical Engineering Faculty Award 2008-2009
- “A Seed for Purdue” (now called the Excellence in Research) Award, 2009
- **Marion B. Scott Award for Excellence in Teaching 2008**
- Wallace H. Coulter Early Career Award 2007
- **Best Teacher Award, Weldon School of Biomedical Engineering 2005-2006**
- NSF Student Fellowship 2003
- UCLA Dissertation Year Fellowship 2002-2003
- UCLA Chancellors Fellowship 1999-2003
- NSF IGERT Fellowship 2000-2002

#### Service:

- **Conference Chair** – IEEE Neural Engineering 2023
- **Head,** Electrical and Computer Engineering, Johns Hopkins University 2021 – 2022



- JHU Homewood Conflict Review Committee 2022 –
- **Interim Head**, School of Electrical and Computer Engineering 2018 - 2019
- External Review Board, School of Engineering, University of Edinburgh 2018
- **Associate Head** for Research, Weldon School of Biomedical Engineering 2013 - 2018
- Chief Clinical Translation Officer, College of Engineering 2017 – 2018
- External **Advisory Board**, University of Puerto Rico at Mayaguez 2017 -
- Associate Editor Journal of Neural Engineering 2016 - 2021
- Track chair: Translational Biomedical Engineering, BMES 2017 international meeting
- College of Engineering , Dean of Engineering search committee 2016-2017
- Bindley Bioscience Center director search committee 2015-2016
- Session chair: Networked Neural Sensors and Instrumentation, BMES 2014 int. meeting
- Preeminent team search committee chair 2013 – 2018
- PQP Committee Chair 2011-2012
- College of Engineering Curriculum Committee 2009-2013
- **Associate Editor** IEEE Trans. Biomedical Engineering 2006-
- Faculty Hiring Committee 2005 – 2018
- BME Undergraduate Curriculum Committee 2005, 2010-2014
- BME Graduate Committee 2015 – 2018
- University Undergraduate Curriculum Committee 2009-2010
- Al Mann Institute Recruitment Committee 2005-2006
- PQP Committee 2006-2008
- Graduate committee subcommittee on curriculum reform Spring 2006
- Faculty Mentor Purdue Boilerbreakers Club 2005-2012
- Faculty Mentor BME GSA 2005-2006
- Faculty Mentor BMES Chapter 2008-2010

#### **Professional Memberships:**

- Fellow, American Institute for Medical and Biological Engineering (AIMBE)
- Senior Member – Institute of Electrical and Electronics Engineers (IEEE), member 27 yrs
- American Epilepsy Society (AES)



## List of Publications

### Refereed Journals:

1. R. B. Budde, M. T. Williams, **P. P. Irazoqui**, "Temporal Interference Current Stimulation in Peripheral Nerves is not Driven by Envelope Extraction," *J. Neural Engineering*, Vol. 20, No. 2, Apr 2023.
2. E. Biggs, R. Budde, J. G. R. Jefferys, and **P. P. Irazoqui**, "Carotid Body Stimulation as a Potential Intervention in Sudden Death in Epilepsy," *Epilepsy & Behavior*, Vol. 136, Nov. 2022.
3. J. Zhang, K. Kim, H. J. Kim, D. Meyer, W. Park, S. A. Lee, Y. Dai, B. Kim, H. Moon, J. Shah, K. Harris, B. Collar, K. Liu, **P. P. Irazoqui**, H. Lee, S. A. Park, P. Kollbaum, B. Boudouris, and C.H. Lee, "Smart soft contact lenses for continuous 24-hour monitoring of intraocular pressure in glaucoma care," *Nature Communications*, Vol. 13, No. 5518, Sep. 2022.
4. J. Shah, B. Collar, and **P. P. Irazoqui**, "An ASIC System for Closed-Loop Blood Pressure Modulation through Right Cervical Vagus Nerve Stimulation," *IEEE Tran. Biomedical Engineering*, Accepted Mar. 2022.
5. J. Shah, B. Collar, E. Ditslear, and **P. P. Irazoqui**, "A Highly Miniaturized, Chronically Implanted ASIC for Electrical Nerve Stimulation," *IEEE Tran. Biomedical Circuits and Systems*, Vol. 16, No. 2, pp. 233-243. Apr 2022.
6. B. Collar, J. Shah, A. Cox, G. Simón, and **P. P. Irazoqui**, "Parylene-C Microbore Tubing: A Simpler Shunt for Reducing Intraocular Pressure," *IEEE Tran. Biomedical Engineering*, Vol. 69, No. 3, pp. 1264-1272, Mar. 2022.
7. R. Mandal, R. Budde, G. L. Lawlor, and **P. P. Irazoqui**, "Utilizing multimodal imaging to visualize potential mechanism for sudden death in epilepsy," *Epilepsy & Behavior*, Vol. 122, Sep 2021.
8. J. V. Shah, G. O. Albors, J. Williams, Q. Yuan, E. Milla, M. I. Firestone, G. Simon, and **P. P. Irazoqui**, "Clinical study of the IOPTx™ system - an electroceutical wearable to lower intraocular pressure," *Current Eye Research*, Vol. 46, No. 10, pp. 1531-1538, Oct 2021.
9. E. N. Biggs, R. B. Budde, J. G. R. Jefferys, and **P. P. Irazoqui**, "Ictal Activation of Oxygen-Conserving Reflexes as a Mechanism for Sudden Death in Epilepsy," *Epilepsia*, Vol. 62, No. 3, pp. 752-764, Mar 2021.
10. J. W. Tsai, M. P. Ward, **P. P. Irazoqui**, "A DSP Architecture for Distortion-Free Evoked Compound Action Potential Recovery in Neural Response Telemetry System," *IEEE Tran. Biomedical Circuits and Systems*, Vol. 15, No. 1, pp. 29-42, Feb 2021.
11. H. Bhamra, Y. W. Huang, Q. Yuan, **P. P. Irazoqui**, "An Ultra-Low Power 2.4 GHz Transmitter for Energy Harvested Wireless Sensor Nodes and Biomedical Devices," *IEEE Trans, Circ. & Syst. II*, Vol. 68, No. 1, pp. 206-210, Jan 2021.
12. R. B. Budde, D. J. Pederson, E. N. Biggs, J. G. R. Jefferys, **P. P. Irazoqui**, "Mechanisms and Prevention of Acid Reflux Induced Laryngospasm in Seizing Rats," *Epilepsy & Behavior*, Vol. 111 Oct 2020.
13. J. G. R. Jefferys, M. A. Arafat, **P. P. Irazoqui**, and T. A. Lovick, "Brainstem activity, apnea, and death during seizures induced by intrahippocampal kainic acid in anaesthetized rats," *Epilepsia*, Vol 60, No 12, pp. 2346-2358, Dec 2019.
14. B. Collar, G. Simon, Q. Yuan, S. Shen, **P. P. Irazoqui**, "Semi-Permanent Transcorneal Filter Support and in vivo Surgical Implantation Technique for Open-Angle Glaucoma Treatment," *Biomedical Microdevices*, Biomed Microdevices, Vol. 21, No. 92, Nov 2019.
15. M. A. Arafat, L. N. Rubin, J. G. R. Jefferys, and **P. P. Irazoqui**, "A Method of Flexible Micro-Wire Electrode Insertion in Rodent for Chronic Neural Recording and a Device for Electrode Insertion," *IEEE TNSRE*, Vol. 27, No. 9, pp. 1724-31, Sep 2019.
16. J. Somann, K. M. Wasileczuk, K. V. Neihouser, J. Sturgis, G. O. Albors, J. P. Robinson, T. L. Powley, and **P. P. Irazoqui**, "Characterization of Plasma Cytokine Response to Intraperitoneally

- Administered LPS & Subdiaphragmatic Branch Vagus Nerve Stimulation in Rat Model,” *PLOS ONE*, Vol. 14, No. 3, Apr 2019.
17. O. Gall, C. Meng, H. Bhamra, H. Mei, S. John, **P. P. Irazoqui**, “A Batteryless Energy Harvesting Storage System for Implantable Medical Devices Demonstrated In-Situ,” *Circuits, Systems, and Signal Processing Journal*, Vol. 38, No. 3, pp. 1360-73, Mar 2019.
  18. K. M. Wasilczuk, K. Bayer, J. Somann, G. O. Albors, J. P. Robinson, **P. P. Irazoqui**, “Modulating the inflammatory reflex in rats using low intensity focused ultrasound stimulation of the vagus nerve,” *Ultrasound in Medicine and Biology*, Vol 45, No 2, pp. 481-489, Feb 2019.
  19. D. J. Pederson, C. J. Quinkert, M. A. Arafat, J. P. Somann, J. D. Williams, R. A. Bercich, Z. Wang, G. O. Albors, J. G. R. Jefferys, **P. P. Irazoqui**, “The Bionode: a closed-loop neuromodulation implant,” *ACM Transactions on Embedded Computing Systems*, Vol 18, No 1, Feb 2019.
  20. R. B. Budde, M. A. Arafat, D. J. Pederson, T. A. Lovick, J. G. R. Jefferys, **P. P. Irazoqui**, “Acid reflux induced laryngospasm as a potential mechanism of sudden death in epilepsy,” *Epilepsy Research*, Vol 148, pp. 23-31, Dec 2018.
  21. Y. J. Kim, K. R. Saviers, T. S. Fisher, **P. P. Irazoqui**, “Continuous glucose monitoring with a flexible biosensor and wireless data acquisition system,” *Sensors & Actuators: B. Chemical*, Vol 275, pp. 237-243, Dec 2018.
  22. D. S. Wie, Y. Zhang, M. Kim, B. Kim, S. Park, Y. J. Kim, **P. P. Irazoqui**, X. Zheng, B. Xu, C. H. Lee, “Wafer-recyclable, environment-friendly transfer printing for large-scale thin film nanoelectronics,” *Proceedings of the National Academy of Science*, Vol 115, No 31, Jul 2018.
  23. J. Somann, G. O. Albors, K. Neilhouser, K. H. Lu, Z. Liu, A. Durkes, J. P. Robinson, M. P. Ward, T. L. Powley, and **P. P. Irazoqui**, “Chronic Cuffing of Cervical Vagus Nerve Inhibits Efferent Fiber Integrity in Rat Model,” *J. Neural Engineering*, Vol 15, No 3, Apr 2018.
  24. C. Brouillard, J. Crook, **P. P. Irazoqui**, and T. Lovick, “Suppression of Urinary Voiding by Conditional High Frequency Stimulation of the Pelvic Nerve in Conscious Rats,” *Frontiers in Physiology*, Vol 9, pp 437, Apr 2018.
  25. K. Qing, K. M. Wasilczuk, M. P. Ward, E. H. Phillips, P. P. Vlachos, C. J. Goergen, **P. P. Irazoqui**, “B Fibers Are Best Predictors of Cardiac Activity During Vagus Nerve Stimulation,” *Bioelectronic Medicine*, Vol 4, No 5, Apr. 2018.
  26. K. A. Thackston, H. Mei, and **P. P. Irazoqui**, “Coupling Matrix Synthesis and Impedance Matching Optimization Method for Magnetic Resonance Coupling Systems,” *IEEE Transactions on Microwaves Theory and Techniques*, Vol 66, No 3, pp. 1536-1542, Mar 2018.
  27. J. Crook, C. Brouillard, **P. P. Irazoqui**, and T. Lovick, “Chronic implantation of cuff electrodes on the pelvic nerve in rats is well tolerated and does not compromise afferent or efferent fibre functionality,” *J. Neural Engineering*, Vol 15, No 2, Feb 2018.
  28. H. Bhamra, J. W. Tsai, Y. W. Huang, Q. Yuan, J. Shah, and **P. P. Irazoqui**, “A Sub-Cubic Millimeter Wireless Implantable Intraocular Pressure Monitor Microsystem,” *IEEE Transactions on Biomedical Circuits and Systems*, Vol 11, No 6, pp. 1204-1215, Nov 2017.
  29. H. Bhamra, J. Lynch, and **P. P. Irazoqui**, “A Noise-Power-Area Optimized Biosensing Front End for Wireless Body Sensor Nodes and Medical Implantable Devices,” *IEEE Transactions on VLSI*, Vol 25, No 10, pp. 2917-2928, Oct 2017.
  30. H. Mei, K. Thackston, R. Bercich, J. Jefferys, **P. P. Irazoqui**, “Cavity Resonator Wireless Power Transfer System for Freely Moving Animal Experiments,” *IEEE Transactions on Biomedical Engineering*, Vol 64, No 4, pp. 775-785, Apr 2017.
  31. R. A. Bercich, Z. Wang, H. Mei, L. H. Hammer, K. L. Seburn, L. J. Hargrove, **P. P. Irazoqui**, “Enhancing the versatility of wireless biopotential acquisition for myoelectric prosthetic control,” *Journal of Neural Engineering*, Vol 13, No 4, Aug 2016.

32. J. Maeng, Y. J. Kim, C. Meng, **P. P. Irazoqui**, "Three-Dimensional Microcavity Array Electrodes for High-Capacitance All-Solid-State Flexible Microsupercapacitors," *Applied Materials and Interfaces*, Vol 8, No 21, pp. 13458–13465, May 2016.
33. Y. Kim, D. Ha, W. J. Chappell, **P. P. Irazoqui**, "Selective Wireless Power Transfer for Smart Power Distribution in a Miniature-Sized Multiple-Receiver System," *IEEE Tran. Ind. Electronics*, Vol 63, No 3, Mar 2016.
34. H. Mei, Y. W. Huang, K. A. Thackston, **P. P. Irazoqui**, "Optimal Wireless Power Transfer to Systems in an Enclosed Resonant Cavity" *IEEE Antennas and Wireless Propagation Letters*, Vol 15, pp. 1036-1039 Mar. 2016.
35. H. Bhamra, J. Joseph, J. Lynch, O. Z. Gall, H. Mei, C. Meng, J. Tsai, **P. P. Irazoqui**, "A 24  $\mu$ W, Batteryless, Crystal-free, Multi-node Synchronized SoC "Bionode" for Wireless Prosthesis Control," *IEEE Journal of Solid State Circuits*, Vol 50, No 11, pp. 2714-2727, Nov. 2015.
36. Y. Kim, H. Bhamra, J. Joseph, **P. P. Irazoqui**, "An Ultra Low Power, RF Energy Harvesting Transceiver for Multiple Node Sensor Application," *IEEE Transactions on Circuits and Systems II*, Vol 62, No 11, pp. 1028-1032, Nov. 2015.
37. K. Qing, M. P. Ward, **P. P. Irazoqui**, "Burst-Modulated Waveforms Optimize Electrical Stimuli for Charge Efficiency and Fiber Selectivity," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol 23, No 6, pp. 936-945, Nov. 2015.
38. Y. Kim, J. Maeng, **P. P. Irazoqui**, "Eyeglasses-Powered, Contact Lens-Like Platform with High Power Transfer Efficiency" *Biomedical Microdevices*, Vol 17, No 4, Aug. 2015.
39. I. Dryg, K. Qing, M. P. Ward, H. Mei, J. Schaffer, **P. P. Irazoqui**, "Magnetically Inserted Neural Electrodes: Tissue Response and Functional Lifetime," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol 23, No 4, pp. 562-571, Jul. 2015.
40. S. T. Lee, P. Williams, C. Braine, S. W. M. John, **P. P. Irazoqui**, "A Miniature, Fiber-Coupled, Wireless, Deep-Brain Optogenetic Stimulator," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol 23, No 4, pp. 655-664, Jul. 2015.
41. V. Nagaraj, S. T. Lee, E. Krook-Magnuson, I. Soltesz, P. Benquet, **P. P. Irazoqui**, T. Netoff, "Future of Seizure Prediction and Intervention: Closing the Loop," *Journal of Clinical Neurophysiology*, Vol 32, No 3, pp. 194-206, Jun. 2015.
42. M. P. Ward, K. Qing, K. Otto, R. Worth, S. John, and **P.P. Irazoqui**, "A Flexible Platform for Biofeedback-driven Control and Personalization of Electrical Nerve Stimulation Therapy," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol 23, No 3, pp. 475-484, May 2015.
43. J. Maeng, C. Meng, **P. P. Irazoqui**, "Wafer-Scale Integrated Micro-Supercapacitors On An Ultrathin And Highly Flexible Biomedical Platform," *Biomedical Microdevices*, Vol 17, No 1, Feb. 2015.
44. H. Markandeya, **P.P. Irazoqui**, Kaushik Roy, "Low energy two-stage algorithm for high efficacy epileptic seizure detection," *IEEE Transactions on Very Large Scale Integration Systems*, Vol 23, No 1, pp. 208-212, Jan. 2015.
45. J. Lynch, **P. P. Irazoqui**, "A Low Power Logic-Compatible Multi-bit Memory Bit Cell Architecture with Differential Pair and Current Stop Constructs," *IEEE Tran. on Circuits and Systems I*, Vol 61, No 12, pp. 3367-3375, Dec. 2014.
46. G. Xiong, C. Meng, R.G. Reifengerger, **P. P. Irazoqui**, and T.S. Fisher, " Graphitic Petal Micro-Supercapacitor Electrodes for Ultra-High Power Density," *Energy Technology*, Vol 2, pp. 897-905, Nov. 2014.
47. H. Mei, **P. P. Irazoqui**, "Miniaturizing wireless implants," *Nature Biotechnology – News & Views*, No. 32, pp. 1008-1010, Oct. 2014.
48. C. Meng, J. Maeng, S. W. M. John, and **P.P. Irazoqui**, "Ultrasmall integrated 3D micro-supercapacitors solve energy storage on miniature devices," *Advanced Energy Materials*, May 2014.

49. J. A. Wilden, K. Y. Qing, S. Hauser, W. J. McBride, **P. P. Irazoqui**, Z. A. Rodd, "Altering Neuronal Activity of the Nucleus Accumbens Shell by Pharmacological Silencing and Deep Brain Stimulation Reduces Oral Ethanol Consumption in Alcohol-Preferring (P) Rats." *Journal of Neurosurgery*, Vol 120, No 4, pp. 997-1005, Apr. 2014.
50. E. J. Juan, R. Gonzalez, G. Albors, M. P. Ward, **P. P. Irazoqui**, "Vagus Nerve Modulation Using Focused Pulsed Ultrasound: Potential Applications and Preliminary Observations in a Rat" *International Journal of Imaging Systems and Technology*, vol. 14, no. 1, pp. 67-71, Mar. 2014.
51. G. Xiong, C. Meng, R.G. Reifenger, **P.P. Irazoqui**, and T.S. Fisher, "Graphitic petal electrodes for all-solid-state flexible supercapacitors," *Advanced Energy Materials*, vol. 4, no. 3, Feb. 2014.
52. G. Xiong, C. Meng, R.G. Reifenger, **P.P. Irazoqui**, and T.S. Fisher, "A review of graphene-based electrochemical micro-supercapacitors," *Electroanalysis* Jan. 2014.
53. C. Meng, O. Z. Gall, and **P. P. Irazoqui**, "A flexible super-capacitive solid-state power supply for miniature implantable medical devices," *Biomedical Microdevices*, Vol 15, No 6, pp. 973-983, Dec. 2013.
54. R. Bercich, D. R. Duffy, **P. P. Irazoqui**, "Far Field RF Powering of Implantable Devices: Safety Considerations," *IEEE Transactions on Biomedical Engineering*, Vol. 60, No. 8, pp. 2107-2112, Aug. 2013.
55. E. Y. Chow, M. M. Morris, **P. P. Irazoqui**, "Implantable RF Medical Devices," *IEEE Microwave Magazine*, Vol. 14, No. 4, pp. 64-73, May 2013.
56. D. Ha, W.N. de Vries, S.W. John, **P.P. Irazoqui**, W.J. Chappell, "Polymer-Based Miniature Flexible Capacitive Pressure Sensor for Intraocular Pressure (IOP) Monitoring Inside a Mouse Eye," *Biomedical Microdevices*, Vol 14, No 1, pp. 207-215 Feb. 2012.
57. S. Mrigank, S. K. Gupta, S. Raghunathan, **P. P. Irazoqui**, K. Roy, "Low-Power Architecture for Epileptic Seizure Detection Based on Reduced Complexity DWT," *ACM Journal on Emerging Technologies in Computing Systems (JETC) - Special Issue on Implantable Electronics*, Vol 8, No 2, Jun 2012.
58. A.L. Chlebowski, E.Y. Chow, C. Ellison, **P.P. Irazoqui**, "Integrated LTCC Packaging for Use in Biomedical Devices," *Bio-Medical Materials and Engineering*, Vol. 22, No. 6, pp. 361-372, Jan. 2012.
59. A. W. Conovaloff, B. L. Beier, **P. P. Irazoqui**, A. Panitch, "Effects of a synthetic bioactive peptide on neurite growth and nerve growth factor release in chondroitin sulfate hydrogels," *Biomatter*, Vol. 1, No. 2, Dec. 2011.
60. S. Raghunathan, A. Jaitli, **P.P. Irazoqui**, "Multi-Stage Seizure Detection Techniques Optimized for Low-Power Hardware Platforms," *Epilepsy & Behavior*, Vol. 22, pp. S61-S68, Dec. 2011.
61. E.Y. Chow, C.L. Yang, A. Chlebowski, S. Moon, **P.P. Irazoqui**, W.J. Chappell, "Wireless Powering and the Study of RF Propagation Through Ocular Tissue for Development of Implantable Sensors," *IEEE Transactions on Antennas & Propagation*, Vol. 59, No. 6, pp. 2379-2387, Jun 2011.
62. S. Raghunathan, S. Gupta, H. Markandeya, **P.P. Irazoqui**, Kaushik Roy, "Ultra Low-Power Algorithm Design for Implantable Devices: Application to Epilepsy Prostheses," *Journal of Low Power Electronics and Applications*, Vol. 1, pp. 175-203, May 2011.
63. P. Rajdev, M.P. Ward, and **P.P. Irazoqui**, "Effect of Stimulus Parameters in the Treatment of Seizures by Electrical Stimulation in the Kainate Animal Model," *International Journal of Neural Systems*, Vol. 21, No. 2, pp. 151-162, Apr. 2011.
64. M.S. Graves, T. Hassell, B.L. Beier, G.O. Albors, and **P.P. Irazoqui**, "Electrically Mediated Neuronal Guidance with Applied Alternating Current Electric Fields," *Annals of Biomedical Engineering*, Vol. 39, No. 2, pp. 1759-1767, Feb. 2011.
65. B.L. Beier, K.M. Musick, A. Matsumoto, A. Panitch, E.A. Nauman, and **P.P. Irazoqui**, "Toward a Continuous Intravascular Glucose Monitoring System," *Sensors, Special Issue on Biodevices and Materials*, Vol. 11, pp. 409-424, Jan. 2011.



66. E.Y. Chow, A. Chlebowski, **P.P. Irazoqui**, "A Miniature Implantable RF-Wireless Active Glaucoma Intraocular Pressure Monitor," *IEEE Transactions on Biomedical Circuits and Systems*, Vol. 4, No. 6, pp. 340-349, Dec. 2010.
67. A.R. Kahn, E.Y. Chow, O. Abdel-Latif, **P.P. Irazoqui**, "Low-Power, High Data Rate Transceiver System for Implantable Prostheses," *International Journal of Telemedicine and Applications*, Vol. 2010, Nov. 2010.
68. K.M. Musick, A.C. Coffey, and **P.P. Irazoqui**, "Sensor to Detect Endothelialization on an Active Coronary Stent," *BioMedical Engineering OnLine*, Vol. 9, No. 67, Nov. 2010.
69. S. Raghunathan, S.K. Gupta, H. Markandeya, K. Roy and **P.P. Irazoqui**, "A Critical Comparison of Seizure Detection Features for an Implantable Epilepsy Prosthesis," *Journal of Neuroscience Methods*, Vol. 193, pp. 106-117, 2010.
70. E.Y. Chow, A. Chlebowski, S. Chakraborty, W.J. Chappell, and **P.P. Irazoqui**, "Fully Wireless Implantable Cardiovascular Pressure Monitor Integrated with a Medical Stent," *IEEE Transactions on Biomedical Engineering*, Vol. 57, No. 6, pp. 1487-1496, Jun. 2010.
71. M.P. Ward and **P.P. Irazoqui**, "Evolving Refractory Major Depressive Disorder Diagnostic and Treatment Paradigms: Toward Closed-Loop Therapeutics," *Frontiers in Neuroengineering*, Vol. 3, May 2010.
72. P. Rajdev, M.P. Ward, R.M. Worth, J.L. Rickus, and **P.P. Irazoqui**, "Real-Time Seizure Prediction from Local Field Potentials using an Adaptive Wiener Algorithm," *Computers in Biology and Medicine*, Vol. 40, No. 1, pp. 97-108, Jan. 2010.
73. E.Y. Chow, Y. Ouyang, B. Beier, **P.P. Irazoqui**, W.J. Chappell, "Evaluation of Cardiovascular Stents as Antennas for Implantable Wireless Applications," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 57, No. 10, pp. 2523-2532, Oct. 2009.
74. D.B. Jaroch, M.P. Ward, E.Y. Chow, J.L. Rickus, **P.P. Irazoqui**, "Magnetic Insertion System for Flexible Electrode Implantation," *Journal of Neuroscience Methods*, Vol. 183, No. 2, pp. 213-222, Oct. 2009.
75. E.Y. Chow, B. Beier, W.J. Chappell, **P.P. Irazoqui**, "Towards an Implantable Wireless Cardiac Monitoring Platform Integrated With an FDA Approved Cardiovascular Stent," *Journal of Interventional Cardiology*, Vol. 22, No. 5, pp. 479-487, Oct. 2009.
76. S.C. Schachter, J. Gutttag, S. Schiff, D.L. Schomer, **P.P. Irazoqui**, et al., "Advances in the Application of Technology to Epilepsy: The CIMIT/NIO Epilepsy Innovation Summit," *Epilepsy & Behavior*, Vol. 16, No. 1, pp. 3-46, Sep. 2009.
77. S. Raghunathan, S.K. Gupta, M.P. Ward, R.M. Worth, K. Roy, **P.P. Irazoqui**, "The Design and Hardware Implementation of a Low-Power Real-Time Seizure Detection Algorithm," *Journal of Neural Engineering*, Vol. 6, p. 056005, Aug. 2009.
78. M.P. Ward, P. Rajdev, C. Ellison, **P.P. Irazoqui**, "Toward a Comparison of Microelectrodes for Acute and Chronic Recordings," *Brain Research*, Vol. 1282, pp. 183-200, Jul. 2009.
79. S.S. Jedlicka, M. Dadarlat, T. Hassell, Y. Lin, A. Young, M. Zhang, **P.P. Irazoqui**, J.L. Rickus, "Calibration of Neurotransmitter Release from Neural Cells for Therapeutic Implants," *International Journal of Neural Systems*, Vol. 19, No. 3, pp. 197-212, Jun. 2009.
80. E.Y. Chow, C.L. Yang, A. Chlebowski, S. Moon, W.J. Chappell, **P.P. Irazoqui**, "Implantable Wireless Telemetry Boards for in-vivo Transocular Transmission," *IEEE Transactions on Microwave Theory & Techniques*, Vol. 56, No. 12, pp. 3200-3208, Dec. 2008.
81. M. Rokkam, M.R. Chatni, A. ul Haque, A.R. DeCarlo, B.F. Robinson, **P.P. Irazoqui**, D.M. Porterfield, "High-Density Data Acquisition System and Signal Preprocessor for Interfacing with Microelectromechanical System-Based Biosensor Arrays," *Review of Scientific Instruments*, No. 78, pp. 44303-44312, Apr. 2007.

82. A. ul Haque, M. Rokkam, A.R. DeCarlo, S.T. Wereley, H.W. Wells, W.T. McLamb, S.J. Roux, **P.P. Irazoqui**, D.M. Porterfield, "A MEMS Fabricated Cell Electrophysiology Laboratory Biochip for In-silico Calcium Measurements," *Sensors and Actuators*, Vol. 123, pp. 391-399, 2007.
83. A. ul Haque, A.R. DeCarlo, M. Rokkam, S.T. Wereley, **P.P. Irazoqui**, H.W. Wells, W.T. McLamb, S.J. Roux, D.M. Porterfield, "Design, Fabrication and Characterization of an In Silico Cell Physiology Lab for Bio Sensing Applications," *Journal of Physics Conference Series*, Vol. 34, pp. 740-746, 2006.
84. **P.P. Irazoqui**, I. Mody, J.W. Judy, "Inductive Powering in Miniature Implantable Neural Recording Devices," *IEEE EMBS Magazine*, pp. 48-54, Dec. 2005.

#### Invited Book Chapters:

1. R. B. Budde, E. N. Biggs, and P. P. Irazoqui, "Sudden deaths: a failure of feedback control" in *Handbook of Neuroengineering*, N. V. Thakor Ed. Springer, 2023.
2. H. Mei, D. Ha, W. Chappell, **P. P. Irazoqui**, "Chapter 16: Design, Analysis, and Optimization of Magnetic Resonant Coupling Wireless Power Transfer Systems Using Bandpass Filter Theory," in *Wireless Power Transfer*, J. Agbinya, 2<sup>nd</sup> Ed., Aalborg, Denmark: River Publishers, 2016, pp.543-586
3. E.Y. Chow, C. Yang, **P. P. Irazoqui**, "Chapter 9: Wireless Powering and Propagation of Radio Frequencies through Tissue," in *Wireless Power Transfer*, J. Agbinya, Ed., Aalborg, Denmark: River Publishers, 2012, pp.301-336
4. P. Rajdev, **P. P. Irazoqui**, "Chapter 21: Time-Series-Based Real-Time Seizure Prediction," in *Epilepsy: The Intersection of Neurosciences, Biology, Mathematics, Engineering, and Physics*, Ivan Osorio, Ed., Hitten Zaveri, Ed., Mark G. Frei, Ed., Susan Arthurs, Ed., Florida, USA: CRC Press, Taylor & Francis Group, 2011, pp.321-330
5. S. Raghunathan, **P. P. Irazoqui**, "Chapter 22: Optimizing Seizure Detection Algorithms toward the Development of Implantable Epilepsy Prostheses," in *Epilepsy: The Intersection of Neurosciences, Biology, Mathematics, Engineering, and Physics*, Ivan Osorio, Ed., Hitten Zaveri, Ed., Mark G. Frei, Ed., Susan Arthurs, Ed., Florida, USA: CRC Press, Taylor & Francis Group, 2011, pp.331-340

#### Patents:

1. *US 11,376,428* – P. P. Irazoqui, R. B. Budde, E. N. Biggs, V. Ganesh, "Prevention of Reflux Induced Laryngospasm", Issued 12/13/22. **Licensed.**
2. *US 11,529,528* – **P. P. Irazoqui**, G. Simon, G. O. Albors, J. Williams, Q. Yuan, Z. Wang, C. Slaubaugh, "Multi-coil wireless power transfer assembly for wireless glaucoma therapy", Issued 12/20/22. **Licensed.**
3. *WO2017223387A1* – **P. Irazoqui**, G. Simon, G. O. Albors, J. Williams, Z. Wang, Q. Yuan, C. Slaubaugh, H. S. Bhamra, "Wireless glaucoma therapy", Allowed 7/16/21. **Licensed.**
4. *US 10,797,522* – W. J. Chappell, D. Ha, H. Mei, **P. P. Irazoqui**, "Magnetic resonance coupling arrangement", Issued on 10/6/20.
5. *US 10,517,791* – J. K. Lynch, **P. P. Irazoqui**, "Memory Array with Reduced Read Power Requirements and Increased Capacity", Issued on 4/14/20.
6. *US 10,517,791* – M. P. Ward, **P. P. Irazoqui**, M. A. Arafat, "High-resolution, selective and self-optimizing haptic and electrotactile display and methods of use", Issued on 12/31/19.
7. *US 10,517,791* - **P. P. Irazoqui**, S. John, A. Kokini, A. Willats, A. Chelminski, M. Matuscak, G. Simon, "Optical Pressure Treatment through Electrical Stimulation", Issued on 12/3/19. **Licensed.**
8. *US 10,335,547* – M. P. Ward, **P. P. Irazoqui**, "Method and apparatus for closed-loop control of nerve activation", Issued on 7/2/19. **Licensed.**
9. *US 10,176,933* – **P. P. Irazoqui**, O. Gall, C. Meng, J. Maeng, "A super-capacitor and arrangement for miniature implantable medical devices", Issued on 1/8/19.



10. *US 9,662,021* – E. Y. Chow, **P. P. Irazoqui**, B. L. Beier, W. J. Chappell, “Miniature Stent Based Implantable Wireless Monitoring Devices,” Issued on 5/30/17. **Licensed.**
11. *US 9,596,988* – **P. P. Irazoqui**, D. Ha, W. Chappell, S. W. M. John, “Pressure Sensors for Small-Scale Applications and Related Methods,” Issued on 3/21/17. **Licensed.**
12. *US 8,761,898* – D. B. Jaroch, **P. P. Irazoqui**, J. L. Rickus, “Flexible Neural Probe for Magnetic Insertion,” Issued on 6/24/14.
13. *US 8,475,374* – **P. P. Irazoqui**, E. Y. Chow, W. J. Chappell, C. L. Yang, B. Ziaie, “Intra-Ocular Pressure Sensor,” Issued on 7/2/13. **Licensed.**
14. *US 7,639,983* – **P. P. Irazoqui**, J. Morizio, V. L. Go, J. Parmentier, “Wireless Neural Data Acquisition System,” Issued 12/29/09. **Licensed.**
15. *US 7,346,312* – **P. P. Irazoqui**, J. Morizio, V. L. Go, J. Parmentier, “Wireless Neural Data Acquisition System,” Issued 3/18/08. **Licensed.**
16. *Pending US-2019-0336758* – **P. P. Irazoqui**, R. B. Budde, D. Pederson, “Prevention of reflux induced laryngospasm,” Filed 11/7/19. **Licensed.**
17. *Pending US-2019-0275326* – **P. P. Irazoqui**, G. Simon, G. O. Albors, J. Williams, Q. Yuan, “Stimulus coil and pulse generator for wireless glaucoma therapy,” Filed 9/12/19. **Licensed.**
18. *Pending US-2019-0247664* – **P. Irazoqui**, G. O. Albors, D. Pederson, C. J. Quinkert, M. A. Arafat, J. Williams, Z. Wang, J. G. R. Jefferys, T. A. Lovick, T. L. Powley, R. A. Bercich, H. Mei, J. P. Somann, Q. Yuan, “System for wireless recording and stimulating bioelectric events,” Filed 8/15/19. **Licensed.**
19. *Pending US-2014-0088379* – **P. P. Irazoqui**, B. Bercich, “Wirelessly-Powered Implantable EMG Recording System,” Filed 3/27/14.
20. *Pending US-2010-0137694* – **P. P. Irazoqui**, A. Chlebowski, C. Ellison, W. J. Chappell, “Radio Transparent Sensor Implant Package,” Filed 6/3/2010. **Licensed.**

#### Select Invited Talks:

1. **P. P. Irazoqui**, “Gastric-Acid Induced Laryngospasm as a Novel SUDEP Mechanism” *American Epilepsy Society*, Nashville, TN, December 5<sup>th</sup>, 2022.
2. **P. P. Irazoqui**, “Non-Invasive Closed-Loop Neural Prostheses for Epilepsy” *Duke University*, Durham NC, September 22<sup>nd</sup>, 2022.
3. **P. P. Irazoqui**, “Selective Neuromodulation of Nerve Fibers” *Duke University*, Durham NC, September 21<sup>st</sup>, 2022.
4. **P. P. Irazoqui**, “Closed-Loop Neural Prostheses for SUDEP” *Partners Against Mortality in Epilepsy*, Zoom, May 24<sup>th</sup>, 2022.
5. **P. P. Irazoqui**, “Electroceuticals in Epilepsy” *Johns Hopkins Medical School*, Baltimore, MD, Fall 2021.
6. **P. P. Irazoqui**, “Electroceuticals in Glaucoma” *Wilmer Eye Institute*, Baltimore, MD, Fall 2021.
7. **P. P. Irazoqui**, “Electroceuticals in Epilepsy and Glaucoma” *Carnegie Mellon University*, Pittsburgh, PA, Fall 2021.
8. **P. P. Irazoqui**, “Electroceuticals,” *Indian Institute of Science*, Bangalore, India, Winter 2020.
9. **P. P. Irazoqui**, “Electroceuticals,” *Dr. Reddy’s Labs*, Hyderabad, India, Winter 2020.
10. **P. P. Irazoqui**, “Electroceuticals,” *IIT Delhi*, Delhi, India, Winter 2020.
11. **P. P. Irazoqui**, “Cyborgs,” *VI Jornada Transatlantica*, Bilbao, Spain, Fall 2019
12. **P. P. Irazoqui**, “Cyborgs,” *Sonoma Valley Authors Festival*, Sonoma, CA, Spring 2019.
13. **P. P. Irazoqui**, “Electroceuticals,” *Rainbow Children’s Hospital*, Cleveland, OH, Fall 2018.
14. **P. P. Irazoqui**, “Electroceuticals,” *Sonoma Valley Authors Festival*, Sonoma, CA, Spring 2018.
15. **P. P. Irazoqui**, “Electroceuticals,” *Congreso Internacional México Transatlantico*, Monterrey, México, Spring 2018.

16. **P. P. Irazoqui**, "Myonode," *International Society of Electrophysiology and Kinesiology*, Chicago, IL, Summer 2016.
17. **P. P. Irazoqui**, "Wireless Power Transfer for Implantable Medical Devices," *Int. Symp. Low Power Electronics*, Rome, Italy, Summer 2015.
18. **P. P. Irazoqui**, "Modulating Urinary Incontinence," *Glaxo-Smith Kline*, Los Angeles, CA, Spring 2015.
19. **P. P. Irazoqui**, "Immune Regulation," *Cyberonics*, Houston, TX, Winter 2015.
20. **P. P. Irazoqui**, "Implantable Networkable Devices," *Clemson University*, SC, Fall 2014.
21. **P. P. Irazoqui**, "Keynote," *NIH Wireless Health*, Bethesda, MD, Fall 2014.
22. **P. P. Irazoqui**, "Implantable Device for Drug-Addiction," *NIH NIDA*, Bethesda, MD, Summer 2014.
23. **P. P. Irazoqui**, "Cyber-Physical Systems," *National Science Foundation*, DC, Winter 2014.
24. **P. P. Irazoqui**, "Implantable Networks of Wireless Nanoelectronic Devices," *University of Illinois at Urbana-Champaign*, IL, October 2013.
25. **P. P. Irazoqui**, "Translational Medical Collaborations in Neuroengineering," *mGluRs Keynote – Wabash College* IN, September 2013.
26. **P. P. Irazoqui**, "Purdue-Jax Partnership: Initiatives in Translational Medicine," *The Jackson Laboratory*, ME, August 2013.
27. **P. P. Irazoqui**, "Advances in Neuromodulation," *IEEE Engineering in Medicine and Biology (EMBC) Conference*, Osaka, Japan, July 2013.
28. **P. P. Irazoqui**, "Autonomous Neural Control," *TEDx*, Purdue, IN, April 2013.
29. **P. P. Irazoqui**, "Implantable Devices," *University of Puerto Rico*, Mayaguez, PR, January 2013.
30. **P. P. Irazoqui**, "Neuromodulation: Short Course," *Cyberonics Inc.*, Houston, TX, January 2013.
31. **P. P. Irazoqui**, "Research Overview: Center for Implantable Devices," *Volcano Corporation*, San Diego, CA, May 2012.
32. **P. P. Irazoqui**, "Linking Neurons to Electronics: Implants, Prosthetics, and Beyond," *Biotechnology Pugwash: The Risks and Rewards of Rewriting Life*, West Lafayette, IN, March 2012.
33. **P. P. Irazoqui**, "Implantable Devices for Optogenetic Neuromodulation in a Mouse Animal Model," *International Workshop on Seizure Prediction*, Dresden, Germany, September 2011.
34. **P. P. Irazoqui**, "Implantable Devices for Optogenetic Neuromodulation of Epilepsy," *CURE Benefit Keynote Address*, Utica, NY, September 2011.
35. **P. P. Irazoqui**, "Implantable Devices for Optogenetic Neuromodulation of Epilepsy," *Center for Inquiry*, Indianapolis, IN, August 2011.
36. **P. P. Irazoqui**, "Strive for Excellence: Technology Showcase," *Cyberonics, Inc.*, Isle of Dunes, SC, May 2011.
37. **P. P. Irazoqui**, "Wireless Implantable Devices for the Monitoring, Treatment, and Study of Heart Disease," *Advamed*, Washington, DC, October 2010.
38. **P. P. Irazoqui**, "Intracardiac Devices for Continuous Heart Failure Monitoring," *Medtronic*, Minneapolis, MN, April 2010.
39. **P. P. Irazoqui**, "A closed-loop neural prosthesis for epilepsy: whole-system design, integration, and validation," *Design of Medical Devices Conference*, Minneapolis, MN, April 2010.
40. E. Y. Chow, S. Chakraborty, W. J. Chappell, **P. P. Irazoqui**, "Mixed-Signal Integrated Circuits for Self-Contained Sub-Cubic Millimeter Biomedical Implants," *IEEE International Solid-State Circuits Society (ISSCC)*, San Francisco, Feb 2010.
41. **P. P. Irazoqui**, "Continuous Intracardiac Monitoring Device for Heart Failure," *IEEE CASME*, Merida, Mexico, December 2009.
42. **P. P. Irazoqui**, "Continuous Intracardiac Monitoring Device for Heart Failure," *MIT Microsystems Technology Laboratories Workshop*, Boston, December 2009.

43. **P. P. Irazoqui**, "Real-time seizure event detection and stimulation control," *Biomedical Engineering Society (BMES) NERT Workshop*, Pittsburgh, October 2009.
44. **P. P. Irazoqui**, "Clinical Prosthetic Devices for Continuous Monitoring of Intracardiac and Intraocular Pressure," *SRC: Analog Circuit Challenges for Biomed Applications Workshop*, Dallas, July 2009.
45. **P. P. Irazoqui**, S. Raghunathan, P. Rajdev, E. Y. Chow, "Overcoming technical challenges in wireless power delivery and data telemetry, en route to a closed-loop prosthesis for seizure suppression.," *4<sup>th</sup> International Workshop on Seizure Prediction (IWSP)*, Kansas City, June 2009.
46. P. Rajdev, S. Raghunathan, **P. P. Irazoqui**, "Two Algorithms for Real-Time Seizure Prediction and Detection, From an Implanted, Closed-Loop, Epilepsy Prosthesis In Vivo.," *4<sup>th</sup> International Workshop on Seizure Prediction (IWSP)*, Kansas City, June 2009.
47. **P. P. Irazoqui**, "Clinical Prosthetic Devices for Diagnosis and Treatment of Glaucoma," Keynote at *Sociedad Mexicana de Ingenieros Mecanicos*, Puebla, Mexico, 9-17-2008.
48. **P. P. Irazoqui**, "Clinical Prosthetic Devices for Glaucoma," *RFIC Symposium*, Atlanta 6-15-2008.
49. **P. P. Irazoqui**, "Clinical Neural Prosthetic Devices for Epilepsy and Spinal-Cord Injury Repair," *3<sup>er</sup> Simposio Internacional de Ingenieria Biomedica*, Monterrey, Mexico, 4-19-2007.
50. **P. P. Irazoqui**, "Clinical Neural Prosthetic Devices for Spinal-Cord Injury Repair," *Wabash Area Lifelong-Learning Association*, West Lafayette, IN, 3-29-2007.
51. E. Y. Chow, J. L. Rickus, **P. P. Irazoqui**, "RF Telemetry ASICs Enabling Neural Prosthetics for Epilepsy," *American Epilepsy Society*, San Diego, CA, 12-1-2006.
52. R. B. Borgens, **P. P. Irazoqui**, "Treating the Damaged Human Nervous System through Biophysics," *Gordon Conference on Bioelectricity*, Assois, France, 9-3-2006.
53. **P. P. Irazoqui**, "Clinical Neural Prosthetic Devices for Epilepsy, and Spinal-Cord Injury Repair," *University of Texas at Dallas*, 6-27-2006.
54. **P. P. Irazoqui**, J.L. Rickus "Brain-Computer Interfaces for Epilepsy," *Indiana University School of Medicine*, 1-27-2006.
55. **P. P. Irazoqui**, "Brain-Computer Interfaces," *Indiana University Purdue University Indianapolis*, 1-13-2006.

#### Conference Proceedings:

1. H. Bhamra, **P. P. Irazoqui**, "21.3 A sub-mm<sup>3</sup> wireless implantable intraocular pressure monitor microsystem," *IEEE International Solid State Circuits Conference (ISSCC)*, San Francisco, pp. 356-357, (Feb 5-9) 2017.
2. M. Arafat, M.P. Ward, **P. P. Irazoqui**, "Flexible Microelectrode Insertion Method for Deep Brain Region," *IEEE Engineering in Medicine and Biology Conference (EMBC)*, Orlando, (Aug 16-21) 2016.
3. H. Mei, K. Thackston, **P. P. Irazoqui**, "Human Arm Based Coupled Resonator Wireless Power System," *IEEE Engineering in Medicine and Biology Conference (EMBC)*, Orlando, (Aug 16-21) 2016.
4. D. Pederson, J. Jefferys, **P. P. Irazoqui**, "Measuring Respiration in Rats Using a Fully Implantable Wireless Device," *IEEE Engineering in Medicine and Biology Conference (EMBC)*, Orlando, (Aug 16-21) 2016.
5. J Somman, M. P. Ward, J. Tsai, M. Arafat, **P. P. Irazoqui**, "Wireless Bionode Implementation for Treatment of Inflammation," *IEEE Engineering in Medicine and Biology Conference (EMBC)*, Orlando, (Aug 16-21) 2016.
6. C. Quinkert, **P. P. Irazoqui**, "Bionode for Fully Wireless Recording of Bladder Pressure and Pelvic Nerve Stimulation in Rodents to Study Urinary Incontinence," *IEEE Engineering in Medicine and Biology Conference (EMBC)*, Orlando, (Aug 16-21) 2016.

7. K. L. Seburn, R. A. Bercich, and P. P. Irazoqui, "Development of Miniaturized, Wirelessly Powered Neuromuscular Recording Devices for Use in Mice." *9th International Motoneuron Meeting*, Halifax, Nova Scotia, Canada (June 15-19, 2014).
8. S. T. Lee, P. A. Williams, D. T. Lin, S. W. M. John, **P. P. Irazoqui**, "Modular Cortex-M0 MCU Platform for Wireless, Controlled Deep Brain LED-Fiber Coupled Optical stimulation in Optogenetics," *6th International IEEE EMBS Neural Engineering Conference*, San Diego, CA, (Nov 6-8), 2013.
9. K. Y. Qing, M. P. Ward, **P. P. Irazoqui**, "Electrical stimulation with burst-modulated pulse waveforms improves efficiency and fiber-selectivity." *6th International IEEE EMBS Neural Engineering Conference*, San Diego, CA, (Nov 6-8), 2013.
10. R. Bercich, Z. Wang, K.L. Seburn, and **P. P. Irazoqui**, "Implantable Sensor for Longitudinal Recording of Spontaneous and Voluntary-Evoked EMG and NAP in Untethered Animals," *6th International IEEE EMBS Neural Engineering Conference*, San Diego, CA, (Nov 6-8), 2013.
11. H. Bhamra, **P. P. Irazoqui**, "A 2-MHZ, Process and Voltage Compensated Clock Oscillator for Biomedical Implantable SoC in 0.18- $\mu$ m CMOS," *IEEE International Symposium on Circuits and Systems (ISCAS)*, Beijing, China (May 19-23) 2013.
12. J. Maeng, D. Ha, W. J. Chappell, and **P. P. Irazoqui**, "Parylene as Thin Flexible 3-D Packaging Enabler for Biomedical Implants," *45th Int. Symp. Microelectronics (IMAPS 2012)*, San Diego, CA, September 2012.
13. D. Ha, T. Lin, W. N. De Vries, B. Kim, A. L. Chlebowsky, S. W. M. John, **P. P. Irazoqui**, and W. J. Chappell, "Ultra-thin Tag Fabrication and Sensing Technique using Third Harmonic for Implantable Wireless Sensors," *IEEE MTT-S Int. Microwave Symp. Digest*, Montreal, Canada, June 2012.
14. T. Lin, D. Ha, W. N. De Vries, B. Kim, A. L. Chlebowsky, S. W. M. John, **P. P. Irazoqui**, and W. J. Chappell, "Ultra-thin Tag Fabrication and Sensing Technique using Third Harmonic for Implantable Wireless Sensors," *IEEE MTT-S Int. Microwave Symp. Digest*, Baltimore, MD, June 2011.
15. B.L. Beier, E.M. Brandner, K.M. Musick, A. Matsumoto, A. Panitch, E.A. Nauman, and **P.P. Irazoqui**, "Preliminary Characterization of a Glucose-Sensitive Hydrogel," *Proceedings of the IEEE Engineering in Medicine and Biology Conference*, Buenos Aires, Argentina, Sep 2010.
16. E.Y. Chow, D.Ha, T. Lin, W.N. deVries, S.W.M. John, W.J. Chappell, and **P.P. Irazoqui**, "Sub-Cubic Millimeter Intraocular Pressure Monitoring Implant to Enable Genetic Studies on Pressure-Induced Neurodegeneration," *Proceedings of the IEEE Engineering in Medicine and Biology Conference*, Buenos Aires, Argentina, Sep 2010.
17. H. Markandeya, G. Karakostas, S. Raghunathan, **P.P. Irazoqui**, and K. Roy "Low-Power DWT-Based Quasi-Averaging Algorithm and Architecture for Epileptic Seizure Detection," *International Symposium on Low-Power Electronics and Design (ISLPED)*, Aug 2010, pp. 301-306.
18. D. Ha, B.G. Kim, T. Lin, Y. Ouyang, **P.P. Irazoqui**, and W.J. Chappell "3D Packaging Technique on Liquid Crystal Polymer (LCP) for Miniature Wireless Biomedical Sensor," *Proceedings of the Microwave Theory and Techniques Symposium*, Anaheim, CA, May, 2010.
19. M.M. Grafton, M.D. Zordan, H.S. Chuang, P. Rajdev, **P.P. Irazoqui**, S.T. Wereley, A.L. Jones, R. Byrnes, P.W. Todd, J.F. Leary "Portable Microfluidic Cytometer for Whole Blood Cell Analysis," *Proceedings of the SPIE*, Vol. 7593, Feb 2010, pp. 75930M-75930M-8.
20. E.Y. Chow, S. Chakraborty, W. J. Chappell, **P. P. Irazoqui**, "Mixed-Signal Integrated Circuits for Self-Contained Sub-Cubic Millimeter Biomedical Implants," *Proceedings of the International Solid State Circuits Conference (ISSCC)*, San Francisco, CA (Feb, 2010)
21. E.Y. Chow, **P. P. Irazoqui**, "High-Frequency Transmitters for Implantable Applications," *IEEE Circuits and Systems for Medical and Environmental Applications Workshop*, Merida, Yucatan, Mexico (Dec 14-16, 2009)



22. P. Rajdev, B. Manola, **P. P. Irazoqui**; "A low power, high compliance neural stimulator" *IEEE Circuits and Systems for Medical and Environmental Applications Workshop*, Merida, Yucatan, Mexico (Dec 14-16, 2009)
23. E. Y. Chow, B. L. Beier, Y. Ouyang, W. Chappell, **P. P. Irazoqui** "High Frequency Transcutaneous Transmission Using Stents Configured as a Dipole Radiator for Cardiovascular Implantable Devices," *Proceedings of the Microwave Theory and Techniques Conference*, Boston, MA (Jun, 2009).
24. S. Raghunathan, M. P. Ward, K. Roy, **P. P. Irazoqui** "A Low-power Implantable Event-based Seizure Detection Algorithm," *3<sup>rd</sup> International IEEE EMBS Conference on Neural Engineering*, Antalya, Turkey (Apr, 2009).
25. C. L. Yang, E.Y. Chow, **P. P. Irazoqui**, W. Chappell, "RF Powering for Embedded Glaucoma Sensors in Miniature Packages," *Proceedings of the URSI General Assembly*, Chicago, IL (Aug, 2008).
26. E. Y. Chow, C. L. Yang, W. Chappell, **P. P. Irazoqui** "Miniature Antenna for RF Telemetry through Ocular Tissue," *Proceedings of the Microwave Theory and Techniques Conference*, Atlanta, GA (Jun, 2008).
27. J. L. Rickus, **P. P. Irazoqui**, "Controlled GABA Release from a Hybrid Cell Silicon Neural Prosthetic," *American Epilepsy Society*, Philadelphia, PA (Dec 2007).
28. E. Y. Chow, A. Kahn, **P. P. Irazoqui**, "High Data Rate 6.7 GHz Wireless ASIC Transmitter for Neural Prostheses," *Proceedings of the IEEE Engineering in Medicine and Biology Conference*, Lyon, France (Aug 22-26, 2007).
29. R. P. Dresher, **P. P. Irazoqui**, "A Compact Nanopower Low Output Impedance CMOS Operational Amplifier for Wireless Intraocular Pressure Recordings," *Proceedings of the IEEE Engineering in Medicine and Biology Conference*, Lyon, France (Aug 22-26, 2007).
30. T. J. Hassell, S. S. Jedlicka, J. L. Rickus, **P. P. Irazoqui**, "Constant-Current Adjustable Waveform Microstimulator for an Implantable Bi-Modal Output Hybrid Neural Prosthesis," *Proceedings of the IEEE Engineering in Medicine and Biology Conference*, Lyon, France (Aug 22-26, 2007).
31. E. Y. Chow, J. L. Rickus, **P. P. Irazoqui**, "RF Telemetry ASICS Enabling Neural Prosthetics for Epilepsy," *American Epilepsy Society*, San Diego, CA (Dec 2006).
32. **P. P. Irazoqui**, "Clinical Neural Prosthetic Devices for Epilepsy and Spinal-Cord Injury Repair," *National Academies Keck Futures Initiative*, Irvine, CA (Nov 8-12, 2006).
33. A. R. De Carlo, M. Rokkam, A. ul Haque, S. T. Wereley, **P. P. Irazoqui**, H. W. Wells, W. T. McLamb, S. J. Roux, D. M. Porterfield, "Development of a Microfluidic Ion Sensor Array (MISA) to Monitor Gravity-Dependent Calcium Fluxes in Ceratopteris Spores," *Gravit. and Space Biol. Bull.* 2006.
34. J. L. Rickus, **P. P. Irazoqui**, "Hybrid Cellular-Silicon Engineered Devices for Neural Prosthetics," *NIH Neural Interfaces Workshop*, Bethesda, MD (Sep 2005).
35. J. Morizio, **P. P. Irazoqui**, V. L. Go, J. Parmentier, "Wireless Headstage for Neural Prosthetics," *2<sup>nd</sup> International IEEE EMBS Conference on Neural Engineering*, Washington, D.C. (Mar, 2005).
36. **P. P. Irazoqui**, I. Mody, J.W. Judy, "In-Vivo EEG Recording Using a Wireless Implantable Neural Transceiver," *1<sup>st</sup> International IEEE EMBS Conference on Neural Engineering*, Capri Island, Italy (Mar 20-22, 2003).
37. **P. P. Irazoqui**, I. Mody, J.W. Judy, "Transcutaneous RF-Powered Neural Recording Device," *24<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Houston, TX (Oct 23-26, 2002), pp. 325.
38. D. L. Ringach, C. E. Bredfeldt, J. D. Dorn, D. Spriggs, **P. P. Irazoqui** (2000) "Dynamics of spatial frequency selectivity in macaque primary visual cortex," *Invest Ophthal & Vis Sci* 41(4): 1749.

39. J. W. Judy, H. Yang, **P. P. Irazoqui**, K. Yang, N. Myung, M. Schwartz, K. Nobe, "Ferromagnetic Micromechanical Magnetometers," *Late News Tech. Dig. Solid-State Sensor and Actuator Workshop* (Hilton Head 2000), Hilton Head Island, SC (Jun 4-8, 2000), pp. 15-16.
40. **P. P. Irazoqui**, J. T. Bernhard, "Examining the Performance Benefits of Antenna Diversity Systems in Portable Wireless Environments," *IEEE Allerton Conference*, Sep 1999.
41. **P. P. Irazoqui**, J. T. Bernhard, C. Short, E. Swanson, "An Analysis and Design Tool for Evaluation of Integrated Antenna Diversity Systems in Portable Wireless Devices," *IEEE Symposium on Antennas and Propagation*, Jun 1999.
42. J. C. Jalbert, **P. P. Irazoqui**, S. Miles, D. R. Blidberg, and D. James, "Solar AUV Technology Evaluation and Development Project," *International Symposium on Unmanned Untethered Submersible Technology*, Sep 7-10, 1997, pp. 69-75.

#### Abstracts:

1. D. J. Pederson, R. A. Bercich, and P. P. Irazoqui, "Emphasizing Application in Bioelectricity Course." *25th Annual Meeting of the Biomedical Engineering Society*, Tampa, FL (Oct 7-10, 2015).
2. K. L. Seburn, R. A. Bercich, Z. Wang, D. Pederson, H. Mei, and P. P. Irazoqui, "Miniature Wireless and Batteryless Device for Longitudinal Recording and Stimulating of Bioelectric Events in Small Animals." *45th Annual Meeting of the Society for Neuroscience*, Chicago, IL (Oct 17-21, 2015).
3. S. T. Lee, P. A. Williams, D. T. Lin, S. W. M. John, **P. P. Irazoqui**, "Towards a wireless, closed-loop optogenetic stimulator for seizure modulation," *6th Annual International Workshop on Seizure Prediction*, San Diego, CA, (Nov 6-7, 2013).
4. K. Y. Qing, M. P. Ward, **P. P. Irazoqui**, "Improving the Efficiency and Selectivity of Electrical Stimulation with Burst-Modulated Pulse Waveforms and Response-Based Stimulus Design." *6th International Workshop on Seizure Prediction*, San Diego, CA, (Nov 6-7), 2013.
5. J. A. Wilden, K. Qing, S. Hauser, W. J. McBride, **P. P. Irazoqui**, Z. A. Rodd, "Unilateral High Frequency Stimulation of the Nucleus Accumbens Shell Reduces Oral EtOH Consumption in Alcohol-Preferring (P) Rats," *American Association of Neurological Surgeons Annual Scientific Meeting*, New Orleans, LA, (Apr 27 – May 1, 2013).
6. L. Rodríguez-Negron, G. Saavedra-Peña, M. Ward, G. Albors, **P.P. Irazoqui**, and E.J. Juan, "Extracellular Recordings of Ultrasound Modulated Potentials in Bufo Marinus Sciatic Nerve," *Biomedical Engineering Society Annual Meeting*, Seattle, WA, Sep. 2013.
7. M.P. Ward, G. Albors, R.M. Worth, K.J. Otto, **P. P. Irazoqui**, "Vagal nerve activation control: A new approach to electrical stimulation-based therapy for treatment-resistant temporal lobe epilepsy," *Proceedings of the American Epilepsy Society*, San Diego, CA (Nov 30 - Dec 3, 2012).
8. S. Lee, K. Qing, J. Joseph, O. Gall, A. Shah, H. Bharmma, **P. P. Irazoqui**, "Design of application specific integrated circuits for RF powered neural recording and closed loop electrical or optical stimulation," *Proceedings of the American Epilepsy Society*, San Diego, CA (Nov 30-Dec 4, 2012).
9. H. Zhang, I. Dryg, H. Mei, K. Qing, **P. P. Irazoqui**, "Magnetically Inserted Microelectrode and Chronic Characterization In Vivo," *Proceedings of the American Epilepsy Society*, San Diego, CA (Nov 30-Dec 4, 2012).
10. R. A. Bercich, J. Joseph, O. Gall, J. Maeng, Y. Kim, **P. P. Irazoqui**, "Implantable Device for Intramuscular Myoelectric Signal Recording," *2nd IEEE EMBS Unconference on Rehabilitation Robotics*, San Diego, CA (August 28, 2012).
11. R. A. González, G. O. Albors, M. P. Ward, E. J. Juan, and **P. P. Irazoqui**, "Vagus Nerve Modulation Using Focused Ultrasound," *12th International Symposium on Therapeutic Ultrasound*, Heidelberg, Germany, 2012.
12. S. Lee, E. Krook-Magnuson, O. Abdel-Latif, C. Armstrong, I. Soltesz, **P. P. Irazoqui**, "LED platform for wireless optical stimulation," *Proceedings of the American Epilepsy Society*, Baltimore, MD (Dec 2-6, 2011).



13. H. S. Markandeya, S. Raghunathan, K. Roy and **P. P. Irazoqui**, "Low-power multi-algorithm programmable seizure detection sub-processor in 65 nm bulk-Si CMOS integrated circuit", *Proceedings of the American Epilepsy Society*, Baltimore, MD (Dec 2-6, 2011).
14. H. Mei, D. Jaroch, M. Ward, K. Qing, **P. P. Irazoqui**, "Magnetically inserted thin flexible microelectrodes", *Proceedings of the American Epilepsy Society*, Baltimore, MD, (Dec 2-6, 2011).
15. S. Raghunathan, S. K. Gupta, H. Markandeya, K. Roy and **P. P. Irazoqui**, "Co-design of hardware and software to optimize seizure prediction and detection algorithms towards a closed loop epilepsy prosthesis", *Proceedings of the American Epilepsy Society*, Boston, MA, (Dec 4-8, 2009).
16. P. Rajdev, M. Ward, **P. P. Irazoqui**, "Comparison of Responsive Neural Stimulation Protocols for Seizure Suppression" *Proceedings of the American Epilepsy Society*, Boston, MA, (Dec 4-8, 2009).
17. P. Rajdev, M. P. Ward, **P. P. Irazoqui**, "Toward an Optimized Responsive Stimulation Protocol for Seizure Suppression," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
18. P. Rajdev, M. P. Ward, **P. P. Irazoqui**, "Prediction of Seizures in Real Time Using an Adaptive Wiener Filtering Based Algorithm," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
19. S. Raghunathan, S. K. Gupta, K. Roy, **P. P. Irazoqui**, "The design of ultra-lower power digital circuits towards an implantable seizure detection algorithm" *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
20. B. S. Manola, **P. P. Irazoqui**, "A 16-Channel Real-Time Neural Recording Chip with Fully Differential Chopper Stabilized Neural Amplifiers for In-Vivo Recordings," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
21. D. B. Jaroch, M. P. Ward, E. Y. Chow, J. L. Rickus, **P. P. Irazoqui**, "Novel Magnetic Insertion System for the Implantation of Flexible Neural Electrodes," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
22. H. Zhang, A. L. Chlebowski, E. Y. Chow, **P. P. Irazoqui**, "Development of an LED Electrode for Neural Stimulation," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
23. N. C. Palettas, A. Petersohn, **P. P. Irazoqui**, "Quantifying Time Delay between Initial Localized Hippocampal Seizures and their Propagation to Globalization," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
24. T. J. Hassell, O. Abdel-Latif, G. O. Arbors, **P. P. Irazoqui**, "A Closed-Looped Implantable Wireless System for In-Vivo Monitoring and Responsive Stimulation of Spinal Cord Injury," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
25. M. S. Graves, **P. P. Irazoqui**, "Electrically-Mediated Neuronal Guidance with Applied AC Electric Fields," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
26. E. Y. Chow, A. Chlebowski, B. L. Beier, W. J. Chappell, **P. P. Irazoqui**, "Wireless Miniature Implantable Active Stent-Based Cardiac Pressure Monitor," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
27. S. Sadaria, Y. J. Koh, R. Bercich, **P. P. Irazoqui**, "Model Cardiovascular Flow System for Testing Stent-Based Sensors," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
28. A. L. Chlebowski, E. Y. Chow, W. J. Chappell, **P. P. Irazoqui**, "An Implantable Microdevice for the Measurement of Glaucoma," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
29. B. L. Beier, K. M. Musick, E. Y. Chow, **P. P. Irazoqui**, "Towards a Continuous Intravascular Glucose Monitor," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
30. K. M. Musick, **P. P. Irazoqui**, "Towards a Prostate Cancer Warning System Implanted Within a Cardiovascular Stent," *BMES 2009 Annual Fall Meeting*, Pittsburgh, PA (Oct 7-10, 2009).
31. E. Y. Chow, A. Chlebowski, S. Raghunathan, B. N. Fogle, G. Simon, J. M. Clevenger, B. Ziaie, **P. P. Irazoqui**, "A 24-Hour Continuous IOP Monitoring Device Used for the Treatment of Glaucoma in Humans," *ARVO 2009 Annual Meeting*, Reducing Disparities in Eye Disease and Treatment, Fort Lauderdale, Florida (May 3-7, 2009)

32. T. J. Hassell, M. S. Graves, G. O. Arbors, A. L. Chlebowsky, **P. P. Irazoqui**, "An Implantable Neuroprosthesis for Central Nervous System Regeneration Using Applied Electric Fields," *BMES 2008 Annual Fall Meeting*. St. Louis, Missouri (Oct 2-4, 2008).
33. E. Y. Chow, W. J. Chappell, **P. P. Irazoqui**, "Wireless Implantable Stent-based Cardiac Pressure Sensor," *BMES 2008 Annual Fall Meeting*, St. Louis, Missouri, (Oct 2-4, 2008).
34. A. L. Chlebowsky, C. Ellison, **P. P. Irazoqui**, "A Comparison of the Inflammatory Response of Alternative Materials for Biomedical Applications," *BMES 2008 Annual Fall Meeting*. St. Louis, Missouri (Oct 2-4, 2008).
35. S. Raghunathan, **P. P. Irazoqui**, "Design of an implantable multi-channel neural recording system towards a closed-loop epilepsy prosthesis", *BMES 2008 Annual Fall Meeting*, St Louis, Missouri, (Oct 2-4, 2008).
36. R. P. Dresher, E. Y. Chow, B. N. Fogle, T. Maleki, G. Simon, J. M. Clevenger, B. Ziaie, **P. P. Irazoqui**, "Improving Glaucoma Treatment: An Implantable IOP Monitor Providing Uninterrupted Measurements," *ARVO 2009 Annual Meeting*, Reducing Disparities in Eye Disease and Treatment, Fort Lauderdale, Florida (May 3-7, 2008)
37. M. S. Graves, B. L. Beier, T. J. Hassell, **P. P. Irazoqui**, "Characterization of Electric Fields Induced by the Oscillating Field Stimulator," *BMES 2007 Annual Fall Meeting*. Los Angeles, California (Sep 26-29, 2007)
38. M. P. Ward, S. T. Lee, P. Rajdev, S. Raghunathan, **P. P. Irazoqui**, "An Objective Comparison of Microelectrodes for Acute and Chronic Recordings," *BMES 2007 Annual Fall Meeting*, Los Angeles, California, USA (Sep 26-29, 2007).
39. M. S. Graves, **P. P. Irazoqui**, "Finite Difference Time Domain and Finite Element Modeling of the Human Spinal Cord for RF Wave Therapeutic Devices," *BMES 2006 Annual Fall Meeting*, Chicago, IL (Nov 2006).
40. A. R. Kahn, **P. P. Irazoqui**, "Microstrip Antennas for Neural Implants," *BMES 2006 Annual Fall Meeting*, Chicago, IL (Nov 2006).
41. M. S. Cohen, T. Alkhudairi, **P. P. Irazoqui**, "Implantable Wirelessly Programmable Neural Interface," *BMES 2006 Annual Fall Meeting*, Chicago, IL (Nov 2006).
42. A. ul Haque, M. Rokkam, A. R. De Carlo, S. T. Wereley, H. W. Wells, W. T. McLamb, S. J. Roux, **P. P. Irazoqui**, D. M. Porterfield, "In Silico Cell Electrophysiology for Measuring Trans-Cellular Calcium Currents," *SPIE Optics East Meeting*, Boston, MA (Oct 2006).
43. M. Rokkam, **P. P. Irazoqui**, A. ul Haque, A. R. De Carlo, S. T. Wereley, H.W. Wells, W.T. McLamb, D. M. Porterfield, "Development and testing of an amplifier array for interfacing multichannel digital data acquisition and in silico cell physiology MEMS sensor devices," *Institute of Biological Engineering Annual Meeting*, (Mar 8-12, 2006).
44. **P. P. Irazoqui**, S. Makgill, V. L. Go, J. Bender, J. Morizio, "Wireless Neural Data Acquisition System," *34<sup>th</sup> Annual Meeting of the Society for Neuroscience*, San Diego, CA (Oct 24-27, 2004), pp. CD-ROM.
45. **P. P. Irazoqui**, I. Mody, J.W. Judy, "Wireless Recording Device for Chronic Monitoring of EEG and Single-Unit Activity," *32<sup>nd</sup> Annual Meeting of the Society for Neuroscience*, Orlando, FL (Nov 2-7, 2002), pp. CD-ROM.

#### Theses:

1. V. Ganesh – "Development of a Closed-Loop. Implantable Electroceutical Device for Gastric Disorders," Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (November 2022).
2. E. Biggs – "On the Role of, and Intervention in, Oxygen-Conserving Reflexes in Sudden Unexpected Death in Epilepsy," Ph.D. Dissertation, School of Biomedical Engineering, Purdue University, West Lafayette, (July 2022).

3. J. Shah – “*Development of a Closed-Loop, Implantable, Electroceutical Device for Glaucoma*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (July 2021).
4. C. Quinkert – “*Practical and Reliable Wireless Power Supply Design for Low Power Implantable Medical Devices*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (December 2020).
5. R. Mandal – “*MRI Integrated Systems for Multimodal Imaging*,” Ph.D. Dissertation, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (November 2020).
6. J. W. Tsai – “*Digital Signal Processing Architecture Design for Closed-Loop Electrical Nerve Stimulation Systems*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (August 2020).
7. M. Arafat – “*Method of Thin Flexible Microelectrode Insertion in Deep Brain Region for Chronic Neural Recording*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (October 2019).
8. R. Swenson – “*Design of a Closed-Loop System for Glaucoma Treatment Including Measurement of Intraocular Pressure and Therapeutic Stimulation of the Eye*,” M.S. Thesis, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (April 2019).
9. D. Pederson – “*Determining, Treating, and Preventing Mechanisms of Sudden Death in Epilepsy Using Medical Implantable Devices*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (November 2018).
10. J. Williams – “*Magnetically-Coupled Circuits Systems for Wireless Excitation of Passive Stimulators for Stimulation Therapies and Application as a Treatment for Glaucoma*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (October 2018).
11. J. Somman, “*A Study of Techniques and Mechanisms of Vagus Nerve Stimulation for Treatment of Inflammation*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (June 2018).
12. K. Wasilczuk, “*Low Intensity Focused Ultrasound Stimulation of the Vagus Nerve for Modulating the Inflammatory Reflex Assessed in Rat Model*,” M.S. Thesis, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (April 2017).
13. G. Seo, “*Bionode5.0: a Miniature, Wireless, Closed-Loop Biological Implant for Neuromodulation*,” M.S. Thesis, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (April 2017).
14. Y. W. Huang, “*CMOS Low-Power Dynamic Impedance Matching System for Wireless Power Transfer and Pressure Sensor Design for Implantable Devices*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (November 2017).
15. K. Bayer, “*Design of a Small, Affordable Low Intensity Focused Ultrasound Device for Vagus Nerve Stimulation*,” M.S. Thesis, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (November 2017).
16. K. Jarry, “*An Exploratory Study of How Acute Neuromodulation of the Subdiaphragmatic Branches Regulates Inflammation*,” M.S. Thesis, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (June 2017).
17. Y. Kim, “*Low Power Cmos IC, Biosensor and Wireless Power Transfer Techniques for Wireless Sensor Network Application*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (August 2016).
18. H. Bhamra, “*Micro-Power Circuits and Systems for Wireless Sensor Nodes and Implantable Medical Devices*,” Ph.D. Dissertation, School of Electrical and Computer Engineering, Purdue University, West Lafayette, (August 2016).

19. R. Bercich, "*Improving the Mechanistic Study of Neuromuscular Diseases through the Development of a Fully Wireless and Implantable Recording Device*," Ph.D. Dissertation, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (May 2016).
20. K. Thackston, "*Optimization of Wireless Power Networks for Biomedical Applications*," M.S. Thesis, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (May 2016).
21. H. Mei, "*Coupled Resonator Based Wireless Power Transfer for Bioelectronics*," Ph.D. Dissertation, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (May 2016).
22. K. Qing, "Optimizing the neural response to electrical stimulation and exploring new applications of neurostimulation," Ph.D. Dissertation, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (May 2015).
23. S. T. Lee, "Wireless tools for neuromodulation," Ph.D. Dissertation, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, (May 2015).
24. O. Gall, "Power Management of Miniature Implantable Device Systems," Ph.D. Dissertation, School of Electrical & Computer Engineering, Purdue University, West Lafayette, (May 2014).
25. J. Maeng, "Parylene-Based Three-Dimensional Microsystems Packaging for Autonomous Wireless Implantable Medical Devices," Ph.D. Dissertation, School of Electrical & Computer Engineering, Purdue University, West Lafayette, (May 2014).
26. I. Dryg, "*Magnetically Inserted Neural Electrodes: Immune Response and Functional Lifetime*," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (Jul 2013).
27. M. P. Ward, "*Cranial nerve modulation for treatment-resistant major depressive disorder and temporal lobe epilepsy*," Ph.D. Dissertation, Weldon School of BME, Purdue University, West Lafayette, (May 2012).
28. A. L. Chlebowski, "*An Implantable Intraocular Pressure Monitoring Device*," Ph.D. Dissertation, Weldon School of BME, Purdue University, West Lafayette, (May 2012).
29. E. M. Cook, "*Miniaturization of a Radio Frequency Powered Implantable Electrode for Targeted Muscle Reinnervation*," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (May 2012).
30. A. Jaitli, "*Validation of Real time seizure detection algorithm and Control towards Closed loop epilepsy prostheses*," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (May 2012).
31. B. L. Beier, "*The Design and Development of a Continuous Intravascular Monitoring Stent*," Ph.D. Dissertation, Weldon School of BME, Purdue University, West Lafayette, (Dec 2011).
32. B. Bercich, "*Robotic Arm for Testing and Demonstration of Targeted Muscle Reinnervation with Implications for Low-Cost Upper-Limb Prostheses*," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (Apr 2011).
33. S. Sadaria, "*Wireless Single Channel Sensor for Targeted Muscle reinnervation*," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (Apr 2011).
34. P. Rajdev, "*Seizure Prediction and Optimized Control Algorithms for Epilepsy Prostheses*," Ph.D. Dissertation, Weldon School of BME, (Feb 2011).
35. T. Hassell, "*A Wireless Implantable System For The Real-Time Surveillance And Modulation of Central Nervous System Recovery Following Spinal Cord Injury*," Ph.D. Dissertation, Weldon School of BME, (Dec 2010).
36. S. Raghunathan, "*Low-power seizure detection hardware on integrated neural recording platforms for closed-loop epilepsy prostheses*," Ph.D. Dissertation, Weldon School of BME, (Nov 2010).
37. B. L. Beier, "*Toward a Continuous Intravascular Glucose Monitoring System*," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (Apr 2010).
38. A. R. Kahn, "*A High Data-Rate Wireless Receiver for Implantable Biomedical Devices*," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (Apr 2010).
39. G. O. Albors, "*A Programmable Wireless Oscillating Field Stimulator*," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (Dec 2009).



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40. A. L. Chlebowski, "Advanced Radio Frequency Materials for Packaging of Implantable Biomedical Devices," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (Jul 2009).
  41. M. S. Graves, "High Duty-Cycle AC Stimulation for Electrically-Mediated Spinal Cord Therapy," M.S. Thesis, Weldon School of BME, Purdue University, West Lafayette, (Jul 2009).
  42. E. Y. Chow, "Wireless Miniature Implantable Devices and ASICS for Monitoring Treatment and Study of Glaucoma and Cardiac Disease," Ph.D. Dissertation, School of ECE, Purdue University, West Lafayette, (May 2009).
  43. E. Y. Chow, "High Data-Rate Wireless Transcutaneous-Telemetry using High-Frequency ASICs for Neural Prostheses," M.S. Thesis, School of ECE, Purdue University, West Lafayette, (May 2007).
  44. **P. P. Irazoqui**, "Transcutaneous Inductively-Powered Neural Recording System," Ph.D. Thesis, BME Department, University of California, Los Angeles, (May 2003).
  45. **P. P. Irazoqui**, "Evaluation of Integrated Antenna Diversity Systems," M.S. Thesis, ECE Department, University of New Hampshire, Durham, (May 1999).